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**MILL FORK FEDERAL COAL LEASE TRACT UTU-71307  
ENVIRONMENTAL ASSESSMENT  
LEASE-BY-APPLICATION NO. 11**

**June 1997**

**USDA, Forest Service, Region 4  
Manti-La Sal National Forest  
Ferron/Price Ranger District  
Emery County, Utah**

**USDI, Bureau of Land Management  
Utah State Office**

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## CHAPTER I - PURPOSE AND NEED

### A. *Proposed Action*

The proposed action is to lease the Mill Fork Coal Lease Tract on federal lands in Emery County, Utah for underground coal mining.

On February 4, 1993, Genwal Resources, Inc. submitted Coal Lease Application UTU-71307 to the Bureau of Land Management (BLM), Utah State Office, to lease Federal Coal Lands in the vicinity of Mill Fork Canyon. This application is for leasing federal coal reserves adjacent to Genwal's active Crandall Canyon Mine, located approximately 15 miles northwest of Huntington, Utah, on the Price/Ferron Ranger District of the Manti-La Sal National Forest (Figure 1).

The proposed tract lies within the Huntington Canyon-Gentry Mountain and the Ferron Canyon, Cottonwood-Trail Mountain Multiple-Use Evaluation Areas as described in the Manti-La Sal National Forest Land and Resource Management Plan (Forest Plan). The Forest Plan Environmental Impact Statement (EIS) and record of Decision (ROD) makes these areas available for further consideration for coal leasing. The application will be processed according to the Lease-On-Application (LBA) process contained in the BLM Coal Leasing Regulations (43 CFR 3425).

The first step in the lease evaluation process was to delineate a tract. Tract delineation was completed by the BLM on October 2, 1996. The tract delineation report is available in the project file kept at the Manti-La Sal National Forest Supervisors Office. Figure 2 shows the lease tract boundaries as set by the tract delineation team. Named the Mill Fork Lease Tract, the area encompasses approximately 6,440 acres entirely within the proclamation boundaries of the Manti-La Sal National Forest. After tract delineation, the LBA process calls for a Data Adequacy Review, application of Unsuitability Criteria, and conducting an environmental analysis of the proposed action.

Data Adequacy Standards, as established by the Uinta-Southwestern Utah Coal Region, were met in December 1996, after the company submitted supplemental information requested by the reviewing specialists. Application of the Unsuitability Criteria for Coal Mining found in 43 CFR 3461, determined that the proposed tract is suitable for leasing. The Forest Plan shows that seven of the 20 unsuitability criteria are not applicable because these lands/resources do not exist on the forest. Four more criteria were found not to be applicable after exceptions and exemptions were applied. The remaining nine criteria were evaluated on the site-specific basis, and were either found to be not applicable or are excepted pending completion of consultations with the U.S. Fish and Wildlife Service (FWS) and Utah State Historic Preservation Office (USHPO). A detailed discussion regarding the application of the Unsuitability Criteria is contained in the project file.

This document has been prepared to further evaluate the tract for leasing and fulfill analysis requirements of the National Environmental Policy Act of 1969 (NEPA).

### B. *Purpose and Need*

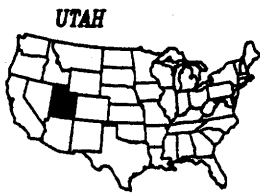
Genwal indicated a need for the additional coal reserves to maintain current production levels, provide a long-term supply of coal and to recover Federally-owned coal deposits that may otherwise be bypassed, and rendered inaccessible. At present production levels and with existing reserves, the mine life is estimated at 5 to 7 years. Addition of coal reserves contained in the Mill Fork Lease Tract

would extend the mine life by about 19 years, and allow the company to be competitive in the current coal market. The BLM, charged with the administration of the mineral estate on these federal lands, is required by law to lease minerals for economic recovery.

*C. Decision to be Made by Responsible Officials/Authority*

The Utah State Director of the BLM is responsible to decide whether or not to offer the tract for leasing under the Mineral Leasing Act of 1920, as amended, and the Federal Regulations 43 CFR 3400. The State Director may also decide to deny the application or conditionally approve one of the alternatives described in Chapter 2. The Forest Supervisor, Manti-La Sal National Forest, must consent to leasing National Forest System Lands before BLM can offer the tract for leasing, according to the Federal Coal Leasing Amendments Act of 1976. The Forest Supervisor must also prescribe terms and/or conditions (through lease stipulations) with respect to use and protection of non-mineral interests. Once a lease is issued, BLM is responsible for lease administration and enforcement of lease terms and conditions.

The proposed action will conform to the overall guidance of the Manti-La Sal National Forest Final EIS and Forest Plan (1986) and the Final EIS for the BLM's San Rafael Proposed Resource Management Plan (1992). This Environmental Assessment (EA) tiers to the decisions of both EISs, which are available for review at the Price Ranger District and the Manti-La Sal National Forest offices and the BLM San Rafael/Price Resource Area and the Moab District offices, respectively. The EA references the Environmental Assessment for Coal Lease Application UTU-68082, LBA No. 9, Crandall Canyon tract (1993).



# MILL FORK LEASE TRACT LOCATION MAP

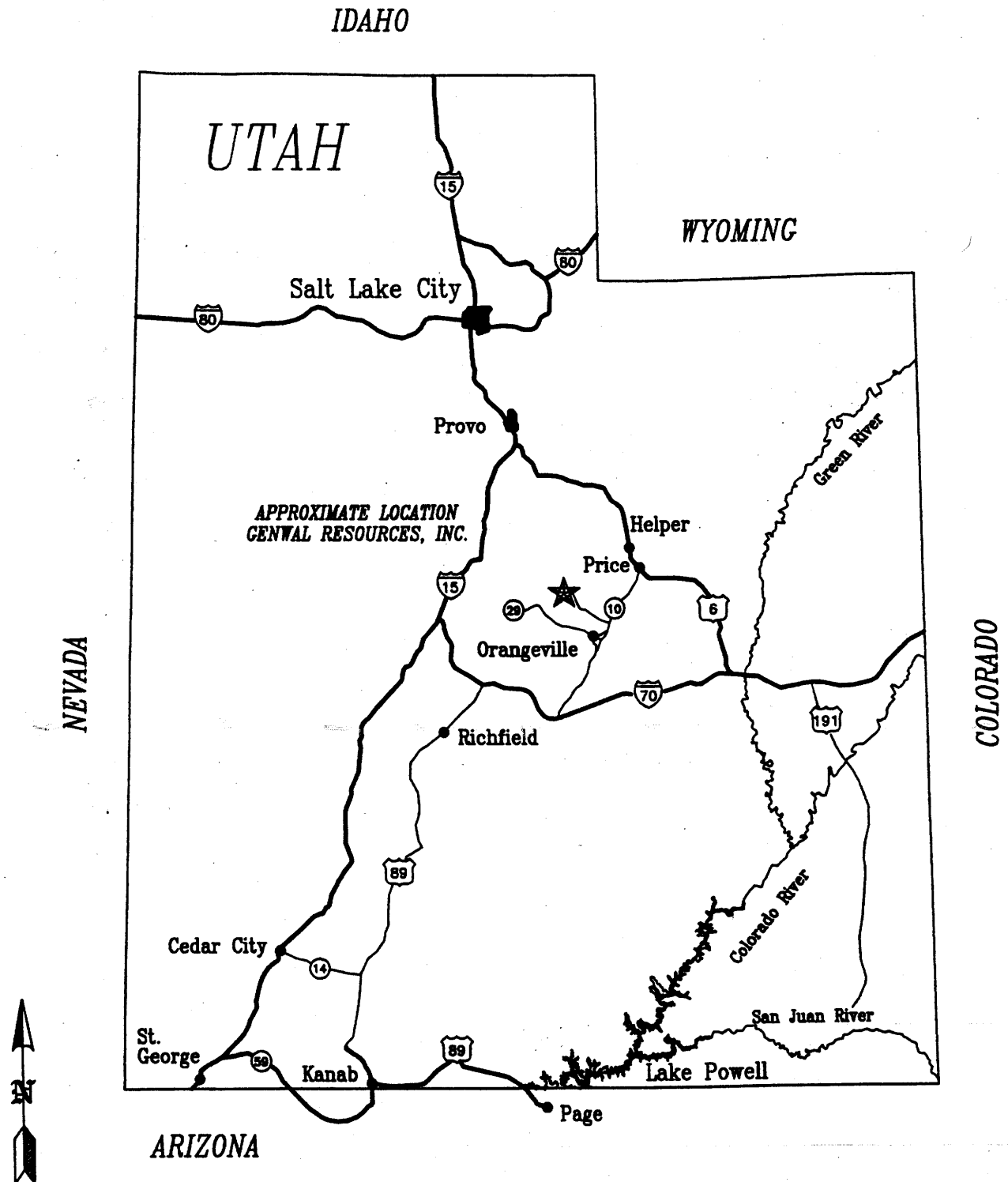
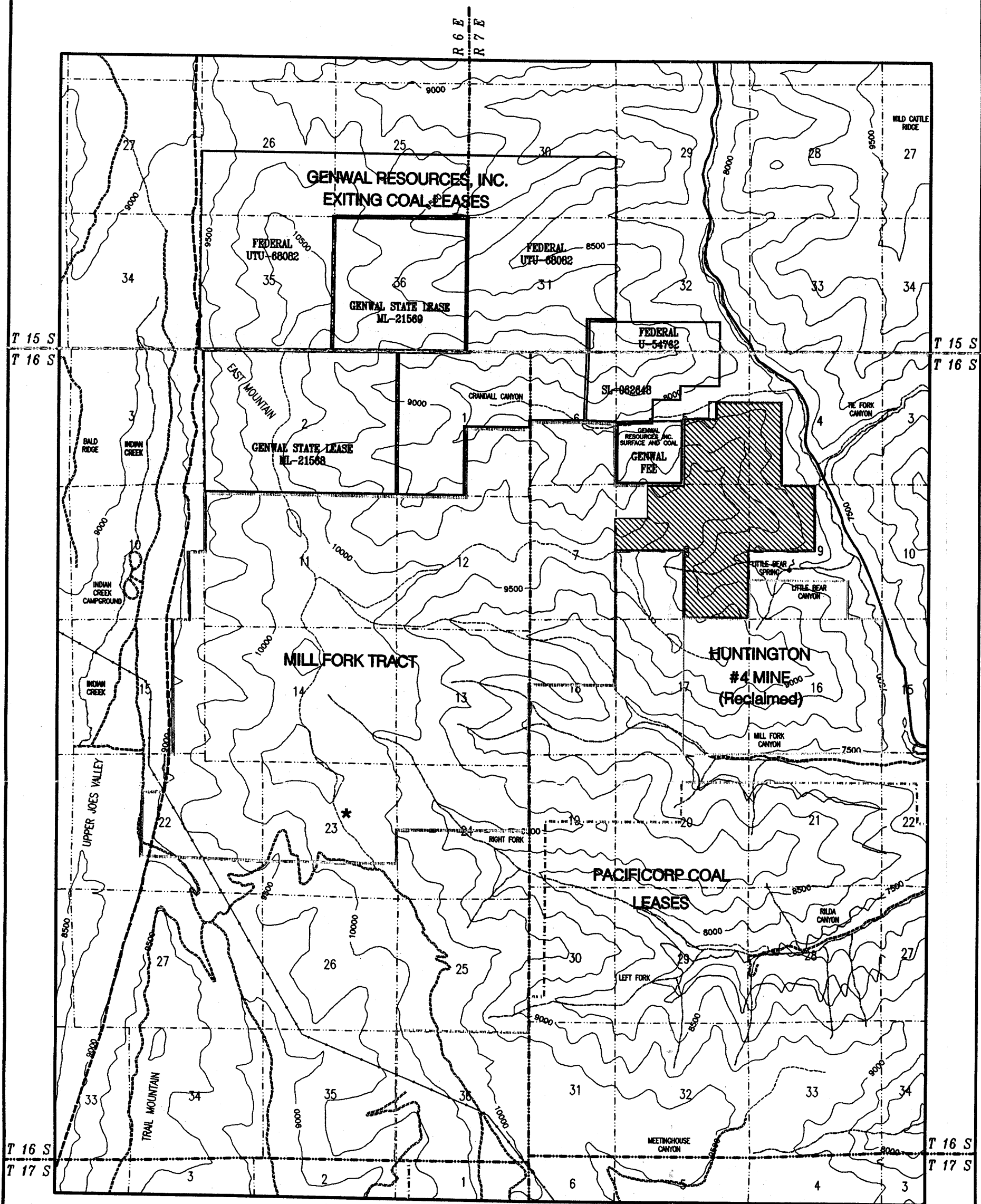


FIGURE 1



1000' 0' 2000' 4000'

FIGURE 2

ALTERNATIVES 2 AND 3

ALTERNATIVE 4  
(excludes hatched area)

# MILL FORK LEASE TRACT PROPOSED ACTION

## LEGEND:

MILL FORK LEASE TRACT  
BURLINGTON RESOURCES  
GAS WELL  
LITTLE BEAR SPRING  
JOES VALLEY FAULT



MANTI-LA SAL  
NATIONAL FOREST

#### *D. Other Authorizing Actions/Authority*

This coal lease application will be processed under the authority of the Mineral Leasing Act of 1920, as amended, and the procedures set forth under Federal Regulations at 43 CFR 3425, Leasing-on-Application. If the tract is leased, granting the lease would give the lessee an exclusive right to mine the coal, but does not authorize mining or surface disturbing activities.

Before any lease development can occur, the lessee or operator must obtain approval of a comprehensive Mining and Reclamation Plan and a mine permit in accordance with the state and Federal Regulations. Surface management agency (in this case the Forest Service) consent and provisions for protection of non-mineral resources are required prior to issuing a permit. Approval of a Resource Recovery and Protection Plan under 43 CFR 3482 and consent from the BLM are also required.

The Surface Mining, Reclamation and Control Act of 1977 (SMCRA) gives the Department of the Interior, Office of Surface Mining (OSM) primary responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations. In January 1981, pursuant to Section 503 of SMCRA, the Utah Division of Oil, Gas and Mining (DOGM) developed, and the Secretary of the Interior approved, a permanent program authorizing Utah DOGM to regulate surface coal mining operations and surface effects of underground mining on non-Federal lands within the state of Utah. In March 1987, under Section 523(c) of SMCRA, Utah DOGM entered into a cooperative agreement with the Secretary of the Interior authorizing Utah DOGM to regulate surface coal mining operations and surface effects of underground mining on Federal lands within the State.

Under the cooperative agreement, Federal coal lease holders in Utah must submit permit application packages (PAP's) to OSM and Utah DOGM for proposed mining and reclamation operations on Federal lands in the State. Utah DOGM reviews the PAP to ensure that the permit application complies with the permitting requirements and that the coal mining operation will meet the performance standards of the approved permanent program. If it does comply, Utah DOGM issues the applicant a permit to conduct coal mining operations. OSM, the BLM, the Forest Service, and other Federal agencies, review the PAP to ensure that it complies with the terms of the coal lease, the Mineral Leasing Act of 1920, NEPA, and other Federal laws and their attendant regulations. OSM recommends approval, approval with conditions, or disapproval of the mining plan to the Assistant Secretary, Land and Minerals Management.

Utah DOGM enforces the performance standards and permit requirements during the mine's operation and has primary authority in environmental emergencies. OSM retains oversight responsibility for this enforcement. BLM and the Forest Service have authority in those emergency situations where Utah DOGM or OSM inspectors can not act before environmental harm or damage occurs.

#### *E. History, Background, and Potential Mining Scenarios*

Genwal Resources, Inc., jointly owned by Intermountain Power Agency (IPA) and Andalex Resources, Inc, has been operating the Crandall Canyon Mine since 1984. Genwal holds 5,600 acres of coal leases on federal, state, and fee lands as shown on Figure 2. The company has a permit and approved mine plan for their existing lease holdings. On February 4, 1993, they applied to lease 4,053 acres of unleased Federal coal lands adjacent to the Crandall Canyon Mine. In order to maximize the coal resource recovery, the tract delineation team expanded the boundaries to encompass 6,440 acres.



3. Utah Department of Transportation (UDOT) may require upgrading SR 31 (Fairview-Huntington Highway) at the Crandall Canyon (FR 248) intersection as coal haul traffic increases as a result of increased production. Increased traffic on the road could exceed the current design standards, and may prompt the need to upgrade to road to accomodate the expanded use.

In addition, the following activities are planned in the foreseeable future for the vicinity of the Mill Fork Lease tract (see Table IV-C):

1. Energy West Mining operates the Deer Creek mine, located approximately 7 miles south of Genwal's Crandall Canyon facilities. Energy West has plans to extend the underground workings into the North Rilda Canyon area, and will be within 1/2 mile of the southeastern edge of the Mill Fork lease tract. Impacts to water resources are of concern.
2. Azalea Oil Company has proposed to drill an exploratory gas well in either North Hughes or Engineer Canyon. The company's preferred location is in Engineer Canyon, approximately 7 miles north of the lease tract up Huntington Canyon. Drilling is scheduled to begin Fall 1997, and last for about 5 months. Amounts of traffic in Huntington Canyon are of concern.
3. The Forest Service will be undertaking a project to improve or close dispersed recreation sites in Huntington Canyon. The Little Bear campground will be improved as a group use site, and a scenic byway site is planned in the area. The first phase of this project will be implemented in late summer 1997. Most of the work will be completed in 1998 and 1999. This project may increase the recreational use in side canyons including Mill Fork, Rilda and Crandall canyons.
4. A large-scale coalbed methane development project has been proposed by River Gas Corporation that would encompass about 188,000 acres primarily on BLM lands. The boundaries of the project area lie about 7 miles to the east and southeast of the lease tract. Impacts relating to the coalbed methane project should not affect the coal lease tract.
5. Livestock grazing is expected to continue on suitable range although the authorized numbers may fluctuate from year to year.

#### *G. Negative Declaration*

There are no prime farmlands, rangelands, or alluvial valley floors within the proposed lease area. Leasing of the tract should not result in significant impacts to paleontological resources; threatened or endangered plant or animal species. Protection of these resources is provided under the lease stipulations and Federal and State laws and regulations.

#### *H. Project Scoping*

Project scoping is an integral part of the environmental analysis process which involves the solicitation of comments from federal, state, and local agencies and interested organizations and individuals. The goal is to assure that the most accurate and current environmental information and public issues are incorporated into planning and decision-making.

## **HYDROLOGY:**

### **Ground Water: (GW)**

**GW1 Mining activities and associated subsidence-induced ground movements could interrupt or degrade springs within or adjacent to the lease tract.**

1. Little Bear Spring is used as a culinary water source for the cities of Huntington, Cleveland and Elmo. Development is administered by the CVSSD. Recharge to the Little Bear Spring could be interrupted or degraded as a result of underground mining. The concern is for diminishing quality and quantity of the ground-water and surface-water resources that feed the spring. Although the mining operations are at a higher elevation than the spring, overburden alteration and subsidence could interrupt the flow patterns.
2. North Emery Water Users Association has springs developed in the lower portions of Rilda Canyon. Ground water occurring in the Right Fork of Rilda Canyon may be intercepted or rerouted as a result of subsidence-induced ground movements and fracturing of the strata. Studies performed by PacifiCorp have indicated that approximately 80% of the recharge to these springs originates in the Right Fork of Rilda Canyon.
3. Other springs occurring within the lease tract, especially those which are important sources of water for stock and wildlife watering, and support riparian/wetlands habitat may be interrupted by subsidence-induced ground movements.

#### **Evaluation Criteria:**

- 1) Increases or decreases in flow from springs based on baseline information provided in the Data Adequacy package.
- 2) Changes in water quality from the springs based on parameters measured for Data Adequacy.

### **Surface Hydrology: (SW)**

**SW1 Riparian areas and wetlands could be diminished or lost if mining operations intercept water from streams, seeps or springs now supporting wetlands.**

Wetlands occur in the Indian Creek drainage and additional smaller wetlands and riparian areas occur throughout the lease tract. The wetlands in Indian Creek are supported in part from flow in ephemeral drainages on East Mountain. Subsidence or other operations could divert water supplying these areas. The wetlands often support diverse communities of amphibians, macroinvertebrates ( Forest Management Indicator Species) and other flora and fauna.

#### **Evaluation Criteria:**

- 1) Increases or decreases in spring flows feeding wetlands.
- 2) Wetlands/riparian areas (acres or individual) that reduce in size or become dry due to subsidence-related changes in subsurface flows.

**Evaluation Criterion:**

- 1) Number of raptor nests lost to subsidence.

**AQUATIC WILDLIFE: (FI)**

- FI1 Aquatic habitat could be altered if the character or quantity of streams and stream-flows change as a result of subsidence.**

This concern relates to both perennial and intermittent drainages that could be affected directly, indirectly, or cumulatively by coal mining actions. Intermittent channels that run only in the spring are important because they provide spawning habitats for trout populations in Huntington Creek; an important sport fishery. Spawning habitat (low-gradient riffles) may become inaccessible due to step-like fragmentation of the longitudinal profile of the stream. Studies in Burnout Canyon, although inconclusive, suggest that subsidence may cause fragmentation of riffles into cascades. Drops of twelve inches or more are considered barriers for inland trout species. It is conceivable that subsidence could shift the stream substrate enough to present barriers to the movement of spawning fish.

**Evaluation Criteria:**

- 1) Changes in discharge (runoff and baseflow).
- 2) Changes in fish populations.

- FI2 Water withdrawals within the Colorado River Basin impact the habitats of the four endangered fish species in the Colorado River and its tributaries: the Colorado squawfish, razorback suckers, bonytail chubs, and humpback chubs.**

Water withdrawals, for example water used for coal exploration drilling, could trigger consultation requirements with the US Fish & Wildlife Service, if the useage exceeds 75 acre feet, forest wide, annually.

**Evaluation Criterion:**

- 1) Volume (acre-feet) of water withdrawn from the Colorado River Basin.

**TRANSPORTATION AND ENGINEERING: (EN)**

- EN1 Increased coal production and subsequent haulage needs could cause road damage and conflict with design traffic levels on SR 31.**

The UDOT will continue to recommend improvements to the section of the Fairveiw-Huntington Highway between the eastern Forest Boundary and the Crandall Canyon turn-off if the existing mine traffic continues for an additional extended period or if there is an increase in the daily or hourly traffic volumes. Loss of or disturbance to dispersed picnicking or camping or parking areas, the valley floor, flood plains, riparian areas or flow channels could result if it becomes necessary to increase the roadway width to allow upgrading of the travelway, shoulders, or structural section of the Highway 31.

**Evaluation Criterion:** 1) Recoverable tons of coal, by alternative.

**CULTURAL RESOURCES: (CR)**

**CR1 Mining related activities permitted under this coal lease could affect significant historical properties.**

Key areas potentially containing significant historic properties potentially at risk from subsidence-induced impacts (ie: escarpment failures and severe surface cracking) in the lease tract have been identified.

**Evaluation Criterion:** 1) Number of significant sites found to be located in areas of subsidence-induced impacts.

**SUBSIDENCE: (SU)**

**SU1 Mining-induced subsidence could cause escarpment failure, which may lead to concerns for public safety, visual quality, aquatic habitat and fisheries.**

Potential for escarpment failure exists in Huntington, Mill Fork, Little Bear, and Crandall Canyons. This poses a concern for public safety if subsidence were to trigger rockfalls on roads, trails or into creeks used for recreation (especially fishing). Visual quality may also be degraded in places if escarpment faces are failed. There is also potential for rockfalls to encounter creeks in canyons which may alter the natural flow regime, changing the aquatic habitat.

**Evaluation Criteria:**

- 1) Potential for escarpment failure to cause rocks to reach roads, trails or creeks.
- 2) Size of potential failure.

**RECREATION: (RE)**

**RE1 Coal mining activities could degrade the recreational experience in Huntington and Crandall Canyons for a longer time.**

Leasing additional lands for coal mining in this area will extend the life of the mine and increase the amount of associated activities. Truck traffic, noise, dust, and existing portal facilities reduce the quality of the users' experience at the Crandall Canyon trailhead, and at dispersed recreation sites along lower Huntington Canyon and Little Bear Campground. Additional leasing will prolong the duration of the current impacts.

Issue EN2	Coal mining operations may affect traffic safety at the Crandall Canyon (FR 248) and State Highway 31 Intersection.
Issue EC1	Coal leasing could conflict with oil and gas production.
Issue EC2	Coal mining provides economic benefits such as employment, royalties, income, and tax base to local communities.
Issue EC3	Recoverability of Federal coal reserves.
Issue CR1	Mining related activities permitted under this coal lease could affect significant historical properties.
Issue SU1	Mining-induced subsidence could cause escarpment failure, which may lead to concerns for public safety, visual quality, aquatic habitat and fisheries.
Issue RE1	Coal mining activities could degrade the recreational experience in Huntington and Crandall Canyons.

#### *L. Issues Not Analyzed in Detail*

Some issues were determined to be outside the scope of the proposed action, already decided (by law or Forest Plan, etc.), irrelevant to the decision, or not affected by the proposed action.

**Underground mining may cause transbasinal diversions of intercepted (and then discharged) ground water within watersheds and subwatersheds.**

Ground water intercepted is either used in the mine underground, or discharged from the workings. There was concern that water intercepted underground may be discharged into a watershed other than the one where the ground water was originally destined.

Ground water encountered in the Crandall Canyon mine was determined to have a mean residence time of over 14,000 years and does not contribute to surface flows in the area. There are no developed wells in the lease tract that use ground water from the area.

**Mining related activities, such as drilling, and/or mining-induced subsidence could damage or alter the position of survey monuments and rectangular survey monuments (section corners or 1/4 corners).**

Federal and state law requires the repair or replacement of damaged survey monuments. The Forest Surveyor has provided a list of known section corners, and the application of Special Coal Leasing Stipulation 16 (Appendix A) addresses replacement of these monuments.

**Mining-induced subsidence may cause surface cracking and loss of vegetation important to support livestock grazing.**

## CHAPTER II. DESCRIPTION OF ALTERNATIVES

A no action alternative and three action alternatives were developed to provide a full range of reasonable alternatives that sharply define the significant issues. Some of the alternatives attempt to examine methods which are less environmentally harmful and still achieve at least part of the purpose and need. Alternatives will include mitigation and monitoring to address the issues and anticipated environmental effects. Figure 2 shows the land surface area considered under each alternative.

### A. Alternative 1 - No Action

Alternative 1 addresses the need to provide a "No Action" alternative (40 CFR 1502.14). The Forest Service would not consent to, and the BLM would not approve leasing the Mill Fork Tract as submitted. Subsequently, Alternative 1 would not allow for the mining of the tract, and therefore not provide coal reserves for the mine. No mitigation measures or monitoring would be required as part of this alternative other than meeting Forest Plan direction, standards, and guidelines.

### B. Alternative 2 - Offer for lease with standard BLM Lease Terms, Conditions and Stipulations (stated on Form 3400-12)

The purpose and need of the proposed action is to lease the Mill Fork Tract, as delineated by the Tract Delineation Team, to provide coal reserves for the Crandall Canyon Mine so that current production levels are maintained, and to recover Federally owned coal deposits that may otherwise be bypassed. The Forest Service would consent to, and the BLM would approve, offering the tract of 6,440 acres, as delineated for competitive leasing. It could be leased to Genwal Resources for mining through their Crandall Canyon Mine. Because it is a competitive bid process, another company may also be able to bid on the lease, but this has been deemed unlikely by the BLM mining and economics specialists on the team. The lease would only have the standard BLM terms, conditions and stipulations that are included on the BLM coal lease Form 3400-12 (April 1986) attached. This alternative would not include Special Coal Lease Stipulations for the protection of non-coal resources.

This is not a viable alternative, it is included for analysis purposes only. It is intended to provide the basis for developing Special Coal Lease Stipulations for protection of non-coal resources to be added to alternatives 3 and 4 to mitigate impacts. The reasonably foreseeable development scenario for this alternative assumes that all mineable coal would be recovered to the fullest extent using accepted industry practices. This alternative is not selectable because it is inconsistent with the Forest Plan, and would require a Forest Plan amendment. Environmental impacts resulting from this alternative could cause material damage (functional impairment) of resources. This could be in violation of SMCRA.

**TABLE II - 1**  
**Comparison of Alternatives**

<b>RESOURCE ELEMENT</b>	<b>Alternative 1</b>	<b>Alternative 2</b>	<b>Alternative 3</b>	<b>Alternative 4</b>
<b>Geology, Soils and Mineral Resources</b>	No coal mined	75 million tons could be mined	68 million tons could be mined	63 million tons could be mined
<b>Hydrology</b>				
Surface Water				
Riparian areas, wetlands, streams, seeps and spring	No effect	Potential for change in water quality and quantity	Same as alternative 2 however water replacement would be required	Reduced potential for change in water quality and quantity
Crandall Creek				
Beneficial Use Standards Flow	No effect	Potential for change in quality and quantity from mine discharge	Same as alternative 2 however water replacement would be required	Same as alternative 3
Interception of water at Joes Valley Fault	No effect	Potential to divert water into fractures or fault zone if subsided	Stipulation would prevent subsidence focusing on the fault	Same as alternative 3
<b>Ground Water</b>				
Interrupt springs	No effect	Potential to effect culinary water resources and other springs but would require replacement of water under state law.	Same as alternative 2 but water replacement required at present spring location	Reduced potential due to protecting the Little Bear watershed
<b>Wildlife</b>				
Terrestrial - Spotted Bats & Raptors	No Effect	Potential change to spotted bat and/or raptor habitat	Reduced potential due to involving less escarpment and special stipulation 20 requires mitigation, if bats are found	Same as alternative 3 but with further reduced potential for impact by excluding the northeast portion of the lease tract
Aquatic	No effect	Potential to alter trout habitat and/or Colorado River fish species	Same as alternative 2	Same as alternative 2

RESOURCE ELEMENT	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Subsidence</b>				
Escarpment failure	No effect	Potential for small failures along about 12,800 ft of Castlegate Ss. outcrop	Potential for small failures along about 10,000 ft of Castlegate Ss. outcrop	Potential for small failures along 5,700 ft of Castlegate Ss. outcrop
<b>Recreation</b>				
Recreational experience	Current mining activity would affect recreation quality until mining ceases in 5-7 years and reclamation would begin	Mine life and activity would be extended by 21 years	Mine life and activity would be extended by 19 years	Mine life extended by 17 years



### CHAPTER III.

### DESCRIPTION OF AFFECTED ENVIRONMENT

The lease application area is located in central Utah in the Wasatch Plateau coalfield. The tract is south and adjacent to Genwal Resources Inc.'s Crandall Canyon mine. The Wasatch Plateau is a north-south trending high plateau bounded by the Castle Valley to the east and the Sanpete Valley to the west. The tract is approximately 15 miles northwest of Huntington, Utah. The area is accessed by SR 31 which connects to State Highway 10 that runs between Price and Emery. U.S. Highway 6 accesses Spanish Fork, Price and Green River.

#### *Forest Plan Direction*

The following is a description of the affected environment, which will be presented by individual resource elements for clarity. The management prescriptions for the areas designated in the Forest Plan, are for Forage Production (RNG), Wood-Fiber Production and Harvest (TBR), Riparian Area Management (RPN), and Little Bear Canyon is designated as a Municipal Water Supply (MWS). Management requirements for these areas are found on pages III-64 to III-76 of the Forest Plan.

Under the RNG designation, the Forest Plan management emphasis is on production of forage and cover for domestic livestock and wildlife. When coupled with mineral development, the management prescription calls to "provide appropriate mitigation measures to assure continued livestock access and use", and for "those authorized to conduct developments will be required to replace losses through appropriate mitigations, where site-specific development adversely affects long-term production or management."

Under the TBR management unit, the emphasis is for production and use of wood-fiber for a variety of wood products.

The RPN unit is not delineated in the Forest Plan but management direction requires analysis of RPN units on site-specific project basis. The RPN unit emphasizes management of riparian areas and component ecosystems, including aquatic and riparian communities that occur within 100 feet of perennial streams, springs, seeps, bogs and wet meadows. The goals of management are to "1) maintain water flows to provide free and unbound water within the soil needed to create the distinct vegetative community, 2) provide healthy self-perpetuating plant communities, 3) meet water quality standards, 4) provide habitats for viable populations of wildlife and fish, 5) provide stable stream channels and still water body shorelines, and 6) restore riparian habitats that have been lost through the downcutting of stream channels and wet meadows. With specific regard to mineral management activities in an RPN area, the Forest Plan calls to "avoid and mitigate detrimental disturbance to the riparian area, and initiate timely and effective rehabilitation of disturbed sites, and where possible, to locate mineral activities outside the riparian unit, and to design and locate settling ponds to prevent washout in high water."

Little Bear Canyon to the topographic divide is designated as a MWS (Municipal Water Supply) Management Unit. The General Direction for MWS units is to, "Allow mineral leasing where it has been determined that the stipulated methods of mining will not affect the watershed values to any significant degree." The General direction for geologic resources management is to, "Design activities to minimize negative or emphasize positive effects on

Local geologic structure in the lease tract shows that the strata dip to the east in the eastern portion of the lease tract, to the west in the extreme western portion, and to the northeast in the southeasternmost corner. The Flat Canyon anticline, in the western portion of the tract, trends to the north with the axis underlying sections 11, 14, and 23. A small syncline has been mapped in Little Bear Canyon (in the northeast portion of the tract), that has the axis roughly parallel to Little Bear Creek. Both are gentle folds that have low dips on the flanks.

The western edge of the tract is bounded by the Joes Valley fault, a major north-south trending normal fault that marks the eastern side of the Joes Valley graben. A graben is a block of rock that is displaced downward between two normal faults. Displacement along the Joes Valley Fault ranges from 2,000 to 3,000 feet. Numerous other sympathetic faults have been mapped within the graben. Upper Joes Valley is in the northern end of the graben and contains thick colluvial and alluvial deposits that overlie the North Horn Formation in the valley bottom. According to the Utah Geological Survey, along the east, upthrown side of the Joes Valley fault, the Hiawatha coalbed lies approximately 800 feet below the surface (Kitzmilller 1982).

A series of northeast-southwest trending faults were mapped in the Huntington #4 mine adjacent to the southeast corner of the tract. These faults may indicate an extension of the Mill Canyon graben which was encountered in the Deer Creek mine to the south. A geophysical study performed by PacifiCorp in the Rilda Canyon area also indicates presence of faults along the same trend (Fry and Lloyd, 1991). These faults appear to have 20 to 30 feet of displacement, and dip steeply to the west. Evidence of faulting has also been documented in Little Bear Canyon, and occurs along the same trend of the faults forming the Mill Canyon graben (Nielson, 1996).

The midslope of East Mountain displays extensive land instability characterized by failure of the colluvium. More severely disrupted terrain suggests that deeper slumps may also have occurred. Springs on the western face of East Mountain may be contributing to the instability.

#### Soils

The soils on the lease tract have developed primarily from sandstone and shale parent materials of the North Horn, Price River, Castlegate, and Blackhawk formations. Along the ridge top of East Mountain a few spots have soils developed in Flagstaff limestone. The regolith consists of both residual and colluvial materials, yielding soils that range from shallow to very deep. Most soils are well drained with potentially rapid runoff owing to the steepness of the slopes.

The elevational range of about 7,600 to 10,700 feet and the steep slopes with contrasting aspects account for large soil temperature and moisture differences. The soils on the lower elevation south facing slopes are hot and dry, and those at the higher elevations and north facing slopes are cool and moist. Soil temperature regimes include cryic (cold) and frigid, and the soil moisture regimes are udic (moist) and ustic (semiarid). The aspen and spruce-fir vegetation types are characteristic of the cryic/udic environment and the lower elevation mountain brush with some pinyon-juniper is characteristic of the frigid/ustic situation.

to the proposed lease tract is rated as "high" based on existing production, geologic conditions, and industry interest in leasing available areas. BLM has postponed offering additional oil and gas leases in the tract pending completion of the Mill Fork Tract EA, and/or completion of mine activities within a resultant lease.

## B. *Hydrology*

### Surface Water

Surface drainages within or adjacent to the lease tract include portions of Crandall Creek, Little Bear Creek, Mill Fork Creek, Right Fork of Rilda Creek, and tributaries of Indian Creek. Crandall, Little Bear, Mill Fork and Rilda Creeks drain the east slope of East Mountain and generally flow west to east into Huntington Creek. Huntington Creek flows south and is tributary to the San Rafael River. Several small tributaries of Indian Creek drain the west slope of East Mountain within the lease tract, along with a fragment of Cottonwood Creek in the extreme southwest corner of the tract. Indian Creek flows south to Lowry Water and then to Joes Valley Reservoir. Joes Valley Reservoir drains into Cottonwood Creek (Straight Canyon), also a tributary of the San Rafael River. The San Rafael River is part of the Colorado River Basin. The State of Utah designated standards for water in the Huntington Canyon drainage and Indian Creeks are 1C, 2B, 3A and 4, corresponding to domestic, recreation, cold water fisheries and irrigation beneficial uses. Drainages in the lease tract have been compared to the State of Utah 303(d) list and none of the waters within the lease tract appear on the list.

The portions of Crandall Creek within the lease tract are perennial, and one intermittent tributary is present in section 6, T 16 S, R 7 E. For this environmental analysis, the following criterion defines the perennial nature of streams: flowing 2 of 3 years on or near October 1. The portions of Little Bear, Mill Fork, and the Right Fork of Rilda Creeks are intermittent, and the tributaries of Indian Creek are ephemeral within the tract. The intermittent drainages flow during runoff and when they receive flow from springs, but are usually dry by late summer or early fall. The ephemeral drainages carry water only immediately after storms.

### Crandall Canyon

According to the USGS, discharge from Crandall Creek ranged from a minimum of 0.24 cubic feet per second (cfs) to 97 cfs from 1979 to 1984. Spencer and Kelly (1984) estimated the 2-year recurrence interval flow at about 48 cfs at the confluence with Huntington Creek using a unit hydrograph model. Flow in Crandall Creek immediately above at the mine portal using the proportionate area of the watershed above the mine would be about 41 cfs. About 80 percent of streamflow in Crandall Creek occurs between April and July as a result of snowmelt. Suspended sediment loads in Crandall Creek were measured in 1978 and 1979 and were found to range between 0.08 to 0.41 tons/day based on flow variations (Danielson 1981). Crandall Creek immediately below the mine was designated as a class A1 channel type (steeper than 4% with boulder or bedrock channel) by Raleigh Consultants in a 1992 survey of drainages in the Huntington watershed.

## Rilda Canyon

Rilda Canyon is on the southeast boundary of the lease tract, and the upper portions of the Right Fork of Rilda Canyon lie within the tract boundaries. The Right Fork of Rilda Canyon is intermittent and drains about 2,114 acres. It is a third order canyon, according to Strahler's classification. Genwal's spring and seep inventory finds 41 springs and seeps within the Right Fork of Rilda drainage and reports that 25 of them reach the stream. The flow is classed as follows:

Flow	# of Springs
>25 gpm	4
20-25 gpm	3
15-19 gpm	4
10-14 gpm	7
5- 9 gpm	4
0- 4 gpm	19

A fire occurred in the upper portions of Rilda Canyon in 1992. Observations by Forest Service personnel in July 1996 (Mattson and Reed) showed that a large amount of sediment entered the Right Fork from the burn area during intense precipitation events.

North Emery Water Users Association (NEWUA) has a developed water system in the lower portions of Rilda Canyon on the main stem just below the confluence of the right and left forks. Referred to as springs, the system consists of a series of collection lines and galleries extending westward up Rilda Canyon and southward up a small side drainage. This system serves over 400 connections in the communities of Cleveland, Lawrence and Elmo.

Flows in the Right Fork of Rilda Creek have ranged from approximately 0.5 to 10 cfs during peakflows, and from approximately 0 to 0.5 cfs during baseflow in the years from 1989-1995 (PacifiCorp, 1996).

## Tributaries to Indian Creek

The tributaries to Indian Creek on the west slope of East Mountain are ephemeral. Indian Creek itself is outside the lease tract boundaries. Indian Creek becomes perennial in the SE 1/4, Sec 34, T 15 S, R 6 E, approximately one mile north of the lease tract. Most of the flow likely originates in canyons on East Mountain as either surface flow, or from springs at the base of the colluvial/alluvial toe in the valley floor. Indian Creek progressively gains flow as it picks up water from various springs and stream sources. The Indian Creek valley also supports a large wetland area. Flow records collected by the Forest Service from 1972 to 1975 showed a range of flows for the period of record between 1 cfs and 30 cfs. The seven ephemeral drainages flow from the proposed lease into Upper Joes Valley. From the *Utah Hydrologic Atlas*, the mean annual runoff from the proposed lease is 7 to 8 inches per year on the Joes Valley side of the divide, representing about 1,200 acre-feet (Jeppson et al, 1968). The mean annual runoff from the Upper Joes Valley area is about 9 inches, computing to 4,150 acre-feet. Therefore, the proposed lease area provides about 29% of the water to Indian Creek at the lower lease boundary.

### Perched Water-Bearing Zones

The perched water-bearing zones are typically associated with the North Horn and Price River Formations. The majority of the springs identified within the lease tract occur in the southern half (sections 8, 13 and 23), at the heads of Mill Fork and the Right Fork of Rilda Canyons. Most of these springs issue from the North Horn Formation, and some occur at the contact between the North Horn and the Price River, or at the base of the Castlegate sandstone where it overlies the Blackhawk formation. Flows measured in these springs range from 0.5 to 50 gpm, with most springs flowing approximately 1 to 2 gpm. Typically these springs flow during the spring and summer, but cease by late summer or fall (Genwal, 1996). Another cluster of springs occurs in the head of Little Bear Canyon (in the north east portion of the lease tract). These springs issue from the base of the Castlegate sandstone, or are associated with landslides, and flow from 0.25 to 2 gpm. Numerous other springs were identified on the west flank of East Mountain, and drain towards Indian Creek. Most of these springs issue from the Price River formation or the Castlegate Sandstone, and range from seeps to 10 gpm, with typical flows ranging from 1-2 gpm. A linear alignment of springs in the Indian Creek drainage (in sections 15 and 22, outside the lease tract boundaries) have also been identified and are likely associated with colluvial/alluvial deposits from East Mountain. These occur in the North Horn formation and contribute flow to Indian Creek.

Springs associated with perched water-bearing units are recharged annually by precipitation. Generally, the springs exhibit high flows after snowmelt that recede rapidly to a baseflow condition, or cease flowing by late summer or fall. Most of the precipitation occurs as snow, and because of the high clay contents of the local strata, most water runs off. Only an estimated 5-12% goes to ground-water recharge and most of this resurfaces as springs in the perched water-bearing zones. The rapid response indicates that the springs in the area occur close to their recharge sources. Snowmelt percolates into permeable rocks, and flows vertically until it hits an impermeable layer, then flows laterally. Impermeable layers present in the local strata tend to impede downward migration of flow, except locally through fractures or faults (Danielson, 1981).

In the upper Right Fork of Rilda Canyon, springs high in the drainage basin contribute flow to the creek and likely support shallow ground-water flow in alluvial deposits. The alluvial materials are one source of water that support a culinary water source in the lower portions of Rilda Canyon. North Emery Water Users Association has developed springs and collection galleries in the alluvial materials.

### Ground water in the Star Point Sandstone

According to the USGS, an extensive ground-water system in the Wasatch Plateau is present in the Blackhawk formation and the Star Point Sandstone. In the area of the lease tract, it does not appear that the Blackhawk contains large quantities of water, based on few springs, lack of inflows in the active Crandall Canyon mine workings (except for inflows from intercepted sand channels), and the fact that faults in the Huntington #4 mine south of the lease tract were dry at the mine level (Vaughn Hansen, 1977). It is also unlikely that large amounts of recharge infiltrates from the surface through the Blackhawk and overlying units due to low permeability materials that impede downward migration of water.

emerges from a fracture in the lower portions of the Star Point sandstone, where it is in contact with the low permeability Mancos shale. In the Little Bear Tract Delineation Report (Alvord, 1979), the elevation of the spring is reported to be 7,650 feet, approximately 100 to 150 feet below the Hiawatha coal bed.

Little Bear spring flows continuously, with average monthly discharge ranging from 200 to 440 gpm (CVSSD, 1997). Flow varies seasonally, with a typical increase of 20-40 % in response to spring runoff. The lowest average monthly baseflow recently measured was 198 gpm in April 1995. Isotopic analyses performed to evaluate the age of water indicate that the spring discharges modern water, and has very similar composition to water in both Crandall and Huntington Creeks (Mayo and Associates, 1997). Further chemical analyses show that water from Little Bear spring is very similar to surface water in both Little Bear and Huntington Creeks. Water quality in the spring is good, requiring only chlorine treatment before it is suitable for consumptive use.

The mechanism controlling flow to Little Bear spring is not fully understood. Several studies have focused on the occurrence of the spring, and varying theories have been developed. It is known that the spring issues from a fracture in the lower portions of the Star Point sandstone, and the chemical composition is similar to surface water in the area. The theories are as follows:

1. Water flowing through the Star Point Sandstone emerges at the spring location. Recharge for the spring is coming from the north and west, possibly supported by the Joes Valley Fault (Nielson, 1996).

2. Recharge to the spring comes from flow through the Star Point sandstone from the north and northwest, and surfaces through fractures in the formation (Vaughn Hansen and Associates, 1977).

3. The trend of Huntington Creek follows a series of straight segments that are evident on topographic maps. The portion of Huntington Creek approximately 2 miles north of the lease tract follows a north-south lineation. It has been suggested the trend of the creek in this area is controlled by a north-south anomaly (possibly an unmapped fault) that runs south, through the northeast portion of the lease area in Little Bear Canyon. Water from Huntington, Crandall Creeks and maybe Little Bear creeks enters this anomaly, and travels through it until it is intercepted by the Mill Canyon graben, where it is redirected to the northeast and emerges where the Mill Canyon Graben fault zone intersects Little Bear Canyon. Comparison of the flow hydrographs for the spring and Huntington Creek show a strong correlation, suggesting that water from the spring is derived from surface water sources (Hansen, Allen and Luce, 1997). Spring flow has an apparent time lag of 2 to 4 years against flow in Huntington Creek. Additional flow may reach the spring by surface water seeping into the exposed outcrop of the Star Point sandstone at nearby upgradient locations, or through direct infiltration of precipitation close to the spring source.

Given the most recent studies that indicate water from Little Bear spring is modern, chemically similar to surface water in the area, and given the high discharge rates, it appears that the spring is supported by a system of faults and/or fractures that transmit surface waters from the north. The hydraulic conductivity of the Star Point sandstone is low, and give rise to slow ground-water movement. As demonstrated by Hansen,

4 Sensitive Species)\* which depends on cliffs for roost/hibernation areas. The spotted bat was a candidate mammal for federal listing. The bat is crepuscular/nocturnal and insectivorous. It does not migrate and uses a hibernaculum that maintains a constant above freezing temperature from September to May.

Mule deer (*Odocoileus hemionus*) and elk (*Cervus elaphus*) are common in the region and are Forest Management Indicator species. Summer ranges generally are occupied by deer and elk from middle May through late October, although the exact timing may vary from year to year depending on temperature, snowfall, and range condition. While not a limiting factor to ungulate populations, summer range is important in providing energy reserves to meet deficiencies in winter energy supplies.

Winter range for deer and elk include a variety of slope and vegetation types. Lower slopes throughout much of the study area are mapped by UDWR as critical elk winter range, based on vegetation types, the Forest Plan maps big game winter range at the mouths of Mill Fork and Crandall Canyons. Elk winter range in the region occurs primarily in snow-free open areas, such as meadows and wind-swept ridge tops, interspersed with conifers and aspen for cover.

For deer, south and east facing slopes along portions of Mill Fork, Little Bear Creek, and Crandall Canyons provide relatively warm and snow-free sites, which are especially important during severe winters.

Habitats in the vicinity of the Crandall Canyon Mine are mapped by the UT DWR as including high priority summer range and critical winter range for both deer and elk. Summer range for these species is the mosaic of conifers, aspen, and meadows atop the plateau. Although some summer range does occur at higher elevations within the permit area, it is more prevalent on East Mountain to the west and southwest, and Gentry Mountain to east of Huntington Canyon. The summer range was determined by the UDWR to be in generally fair to good condition.

- \* Sensitive species are defined as those species which have been identified by the Regional Forester as "those... for which population viability is a concern as evidenced by... significant current or predicted downward trends in population numbers or density..." or "significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution" (FSM 2670.5). The 1976 National Forest Management Act (NFMA) directs the Forest Service to provide for the maintenance of viable populations of native and desired non-native vertebrate species and the recovery of listed species.

#### Birds

Approximately 140 species of birds are potentially present in the study area. This number included a number of raptors. Resident raptors in the area include the Golden Eagle (*Aquila chrysaetos*), Goshawk (*Accipiter gentilis*), Red-tailed Hawk (*Buteo jamaicensis*), Sharp-shinned Hawk (*A. striatus*), American Kestrel (*Falco sparverius*), and Great Horned Owl (*Bubo virginiana*). Golden Eagles have been seen above the mine in spring and summer. Golden Eagles prefer nest sites on cliffs, such as the sites available along Huntington Canyon. Goshawks have been observed only in higher

TABLE III-A. Summary of streams within the proposed project area and game fish species (Species abbreviations are explained below).

<b>STREAM</b>	<b>SPECIES PRESENT *</b>	<b>DATA SOURCE</b>
Crandall Creek	CCT (1), RBT, YCT	UT DWR/USU Genetic Analysis
Little Bear Creek	YCT, RBT	Inferred from maps and UT DWR Surveys
Mill Fork Creek	YCT, RBT	Inferred from maps and UT DWR Surveys
Right Fork Rilda Ck.	YCT, RBT	Inferred from maps and UT DWR Surveys
Indian Creek	BKT	Dufour, field observations

\* Species abbreviations in the above table correspond to the following:

YCT = Yellowstone cutthroat (*Oncorhynchus clarki*)

RBT = rainbow trout (*Salmo gairdneri*)

BRT = brown trout (*Salmo trutta*)

BCT = Bonneville cutthroat trout (*Oncorhynchus clarki utah*)

BKT = brook trout

CCT = Colorado River cutthroat (*Oncorhynchus clarki pleuriticus*)

(1) There is a suspected, but yet unconfirmed population of Colorado cutthroats in Crandall Creek.

In addition to the salmonid species listed above, these drainages likely support populations of the following non-game species: speckled dace (*Rhinichthys osculus*), mottled sculpin (*Cottus bairdi*), bluehead suckers (*Pantosteus delphinus*), and mountain suckers (*Catostomus platyrhynchus*) (Christopherson, UT DWR, personal communication).

#### Reservoir and Lake Fisheries

There are no reservoirs or lakes fisheries that could be directly or indirectly affected by land management activities within the proposal area.

#### Sensitive Species

Colorado River cutthroat trout, currently classified as a Sensitive Species in the Intermountain Region (USFS), may be present in the Crandall Creek drainage. Genetic testing is on-going to confirm if these fish are pure-strain Colorado cutthroats, no definitive data is currently available.



Genwal Resources Inc. currently owns and operates mining facilities on a 160-acre private parcel of land within the Crandall Creek drainage adjacent to the project area. These facilities include a mine portal and load-out facility, warehouse, storage building, sediment settling pond, and parking area. Development within these private lands has removed the riparian vegetation along 1000 feet of the north bank of Crandall Creek. The paved road that leads to the mine contributes sediment and coal dust to the stream channel when runoff occurs from sidecast snow (Dufour, personal observation 1997).

#### D. Vegetation

Lands within the lease tract area contain very steep and narrow east-west trending canyons with rounded narrow ridge tops. Vegetative cover and species composition is very diversified. It is mostly regulated by the various habitat created by the broken steep terrain, the variety of slope aspects and exposure. The project area landscapes support a mosaic of sagebrush grasslands, conifer timber, aspen, mountain brush, and riparian vegetation complexes.

**Sagebrush Grasslands** - This vegetative type is found on most of the steep south slopes and high elevation ridge tops. Less than 10% of the lease area occur in the type. Salina wild rye grass is the dominant grass at the lower elevations and Letterman needle grass dominates the high elevation ridge top sites. Few forbs are present in this type. The sagebrush species common in this vegetative type are black sagebrush and big mountain sagebrush. Deer and elk use some of this type during the winter months and sheep graze the ridge tops during the summer.

**Conifer Timber** - It is estimated that about half the lease area is covered with conifer timber vegetative type. These types are mostly found on the northerly exposed slopes of the canyon. Douglas fir make up about 85% of the conifer cover with alpine fir and spruce trees present only at the higher elevation ridge and in the upper basin. The dense forest growth on the steep canyon slopes provide a good scenic view, a good watershed cover and wildlife habitat. Few wood products are accessible in this type within the lease area.

**Aspen** - Aspen type occur on an estimated 20-25% of the lease areas. They occur mostly on mid and higher elevation sites and on the lower canyon slopes. Most of the aspen types within the lease area are in either early or mid-Seral condition. Only a few stands at high elevation and some isolated sites are in late seral condition. Stands of aspen mostly at higher elevations are being invaded by alpine fir trees, and some sites on the north slopes and canyon bottoms are being invaded by Douglas fir trees. The Aspen ecosystem provide a very important habitat component for many wildlife species, both animal and birds. It also has a high value for livestock grazing and watershed values. It provides some scenic beauty, especially in the fall.

**Riparian** - Riparian areas within the lease are very limited occurring in the canyon bottoms and lower drainages. Less than 1% of the lease area has riparian vegetation on it. Although they represent a very small proportion of the total vegetative cover within the project area, and they provide a very important habitat for wildlife. The potential for any livestock grazing in the riparian areas in the lease area, is low because of the limited access and very small sites available.

'b' or 'c' \* and maintenance level 3 or 4 to encourage passenger car traffic, the remaining 40% to 50% is operated at traffic service level 'd' and maintenance level 2 where public traffic (generally high clearance vehicles) are accepted.

- \* Level-of-service A describes primarily free-flow operations at average travel speeds, usually about 90 % of the free-flow speed for the arterial classification. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream.

Level-of-service B characterizes the region of traffic flow wherein speeds of 55 mph are expected on level terrain. Passing demands approximately equals the passing capacity at the lower boundary of level-of-service B which is where flow rate are presently on this section of road. Drivers are delayed up to 45% of the time and the number of platoons forming increases dramatically.

Level-of-service C characterizes the region of traffic flow wherein speeds are between 50 and 55 mph on level terrain. Passing is frequently impeded, there are noticeable platoons of vehicles and platoon size increases. Drivers are delayed up to 60% of the time. While flow is stable, it is susceptible to congestion due to turning traffic and slow moving vehicles.

Level-of-service D characterizes a region of traffic flow where speeds are about 40 % of the free-flow speed. Small increases in flow may cause substantial increases in delays.

SR 31 is the major west-east route across the Wasatch Plateau, and provides access for the recreation uses within Huntington Canyon and on the mountain tops. The highway is located in Huntington Canyon bottom that is to be managed with emphasis on "Undeveloped Motorized Recreation". Range, timber, and mineral resources activities and use should not permanently exceed threshold levels for noise and air quality, or seriously impair recreation uses. SR 31 provides access for removal of Forest products, including timber, minerals, and livestock. Access for recreational uses includes fishing, hiking, picnicking, camping, big game hunting, wood gathering, snowmobile riding and cross-country skiing. SR 31 intersects roads in the adjacent side canyons of Rilda, Mill Fork, and Crandall. All these routes have hardened surfaces.

SR 31 is 48.1 miles long with 33.4 miles within the Forest Boundaries. Three and six tenths miles of the highway are within the transportation analysis area. The road has two 12-foot lanes and 3-foot shoulders, with an asphalt pavement structure. The pavement structure is showing signs of fatigue from the coal-haulage traffic. The annual average daily traffic was 1,400 vehicles per day below the east forest boundary, 1,255 vehicles per day between the boundary and Crandall Canyon, and 715 vehicles per day above Crandall Canyon in 1995. Coal-haulage made up 6.2% of the traffic.

The volume of traffic on the SR 31 with the high number of coal-hauling vehicles in the mix is an important consideration. UDOT has upgraded SR 31 from Huntington to the Forest Boundary because of the traffic volume and mix on the road. They have expressed interest in upgrading the segment within the Forest to the Crandall Canyon intersection to accommodate the coal-haul traffic on this segment. A review of traffic capacity indicates the traffic service levels are acceptable at this time, however, the high volume of traffic and mix of vehicles affects the safety of travel on the road and the traffic entering onto the road. The

#### Mill Fork Canyon Road

This is a local route that served the Huntington #4 Mine. The road has been reclaimed from a two lane gravel surfaces road to a single lane gravel surfaces road to provide additional buffer between the travelway and the stream course. Traffic is estimated under 5 vehicles per day seasonally adjusted daily traffic. Dispersed recreation and range management are the primary generators of traffic in the canyon.

#### Rilda Canyon Road

This is a local route that has recently been upgraded to provide access to a fan portal serving the Deer Creek Mine. Access to spring developments between Sections 28 and 29 is another important user of the road. There is a stock-trail head near the Right Fork that also generate range traffic. The road is a double lane gravel surfaced with inslope and culverts to the spring development. The road is a single lane gravel surfaced with inslope and culverts to the turnaround near the Forks. The road is a single use gated single lane with inslope and outslope section between the forks and fan portal. The public can use the last segment of this road for trail travel. Traffic should remain at less than 10 vehicles seasonally adjusted daily traffic.

#### Flat Canyon Road

This is a local route that provides access to the East Mountain Top. The road was recently improved to provide access for drilling an exploration gas well in Section 23. The road has provided access for coal exploration and developmental drilling in the past. Additional access for staging and drilling operation is likely until all coal is leased and removed. The road was upgraded to a single lane gravel surface road with drainage for the gas drill operations. The traffic should remain between 5 and 10 vehicles seasonally adjusted daily traffic. Use should be about 40% dispersed recreation during big game fall seasons, 40% firewood gathering on the timber sale areas, 10% range access and 10% mineral access.

#### Cottonwood Road

This is the only collector road within the transportation analysis area. The road provides access to the facilities at Trail Mountain Portal below the analysis area, and access to the existing gas wells in Cottonwood Canyon and on the East Mountain Top. The primary use on the segment within the transportation analysis area is recreation access to the developed Indian Creek Campground and dispersed camping and hunting areas in the surrounding area. This road is an important access for the movement and management of livestock on the Forest during the grazing season. Traffic approaches 20 vehicles per day seasonally adjusted on the segment under study.

The East Mountain top has traffic primarily related to range management, dispersed big game hunting, some fire-wood gathering, and mineral exploration or production operations. Some timber related traffic can be expected over short periods to manage the timber emphasis area on or near the East Mountain top. Most of the coal exploration drilling has been completed in the area. Additional coal developmental drilling may be desired as coal mining proceeds.

Nonagricultural employment in the county in 1995 was 3,800 and had been growing modestly. Employment peaked in 1982 at 5,890 and has declined 2,090 jobs or about 36 percent. The major industry payroll categories in Emery County were:

Mining	\$38,500,000	(36%)
Transportation/Public Utilities	\$35,400,000	(33%)
Services	\$15,400,000	(14%)
Public Administration	\$ 7,000,000	(6.5%)
Construction	\$ 6,100,000	(5.5%)
Other	\$ 5,000,000	(5 %)
Total 1995 Payroll for Emery County	\$107,400,000	

Mining, primarily for coal in Emery County, along with related industries, like shipping of the coal and producing electricity in two coal fired generating stations likely contributes over 60% of the earnings of the county. Indications are that much of the growth of coal production in Utah will be in Emery County in the foreseeable future.

#### G. Land Uses

A power transmission line is located in the W 1/2, section 22, T 16 S, R 6 E, in the extreme southwestern portion of the lease tract. Based on draft mine plans submitted, mining will not occur under the powerline and the line is outside the estimated area of surface influence of the closest longwall panel. There will not be further discussion on the powerline in the document.

Two grazing allotments are present on the lands within the lease tract. Presently, 961 sheep graze for three months of the year on the northern end of the tract, and 912 cattle graze at the southern end for about one month per year. Several springs have been developed to enhance livestock distribution.

Land survey monuments and section corners may also be present within the lease tract.

#### H. Cultural Resources

Approximately 650 acres or 10% of the area has been examined for cultural resources. Two archaeological sites are known within the lease area. Another three sites have been located outside of the lease area. Sites located within the lease area consist of lithic scatter sites 42Em856 and 42Em2430. The Forest and the USHPO has concurred that neither of these sites meet the criteria for listing in the National Register of Historic Places.

Other sites known on the periphery, but outside of the lease area include 42Em2310 and 42Em722; both are rockshelter sites containing rock art. Both are believed to be eligible for the National Register. While these sites lie outside of the lease area, they do provide useful information on site types in the general area.

Both of these sites occur within the Star Point sandstone, which appears to provide the most likely areas for rockshelter and rock art sites in this general area. In contrast, the Castlegate

value. Part of the public appeal of the landscape found in this area stems from the viewing opportunities associated with the Castlegate Sandstone escarpments.

## CHAPTER IV. DIRECT AND INDIRECT EFFECTS OF IMPLEMENTATION

### 1. Alternative 1 - No Action

Under this alternative the tract would not be offered for lease, therefore the tract would not be mined.

There would be no additional mining-related environmental consequences to the tract area and surrounding vicinity. There would be no additional economic benefits for federal, state, and local governments from coal lease fees and coal royalties. Neither would there be input to local economies from employees salaries or from payments to local businesses for support of the mine. The existing Crandall Canyon mine would close after coal in the existing leases is mined-out unless other reserves in areas adjoining the permit area are identified and leased. Without additional reserves, the mine would probably close around the year 2005, resulting in the loss of 122 jobs. The current reserve base is about 20 million tons of coal, representing \$ 3.1 million in royalties to the federal government.

With the planned increase in average production to 3.5 million tons, traffic will increase from 437 vehicles per day to 609 vehicles per day with hourly volumes going from 72 to 90 vehicles per hour, with 75% being coal haulage vehicles. This traffic would continue until the year 2005 when the coal reserves will be depleted. Potential for conflicts resulting in accidents will increase. Potential conflicts resulting in time delay will result in level of service decrease from 'B' to 'C'. Maintenance cost will increase as a result of the increased truck traffic requiring replacement or capping of the travelway surface at least once during the use period.

### 2. Alternative 2 - Offer for Lease with Standard BLM Lease Terms, Conditions and Stipulations

Under this alternative the tract would be offered for competitive leasing as recommended by the Coal Tract Delineation Team (see figure 2). The standard BLM lease terms, conditions and stipulations would be included.

#### A. *Geology, Soils and Mineral Resources*

If Genwal Resources, Inc. acquires the lease, underground coal extraction from the tract would likely involve extending workings of the Crandall Canyon mine to the south using standard industry mining practices. More specific details of the mining are discussed in the Reasonably Foreseeable Development Scenario contained in Appendix B. Approximately 75 million tons of coal could be mined under this alternative. This alternative would extend mine life by an additional 21 years.

Both room-and-pillar development mining and longwall mining would take place. Subsidence is expected only over the longwall panels and room-and-pillar areas where secondary recovery occurs. The area of ground surface subsided would include full-extraction mine area and the additional area on the ground surface calculated by projecting a line from the mined area to the ground surface at the expected angle-of-draw (22 degrees). For example, considering overburden thickness of 100 feet and a 22 degree angle-of-draw, the additional subsidence area beyond the vertical projection of the full-extraction area to the surface would be approximately 400 feet. Subsidence could extend 400 feet beyond the lease

The worst-case scenario for the Mill Fork Tract could involve similar failures along portions of the exposed outcrops. Potential failure zones include outcrop areas along the north slope of the South Fork of Mill Fork Canyon (approx. 3,000 ft), the north slope of the North Fork of Mill Fork Canyon (approx. 4,000 feet); the north slope of Little Bear Canyon (approx. 3,500 ft.); and 3 small non-connected outcrops totalling approximately 2,000 feet in length along the south slope of Crandall Canyon, south of the Crandall Canyon Mine surface facilities.

Other escarpments exist where longwall mining is not proposed, due to marginal coal thicknesses and irregular coal configuration. It is hoped that some room-and-pillar mining would occur, but limited data makes mining projections difficult. A few additional cliff areas could be affected if room-and-pillar mining (with pillar extraction) occurs. The ridge point between Crandall and Little Bear canyons (sections 5 and 8, T 16 S, R 7 E) could fail and create a debris fan of about 30 acres. Another location that might be room-and-pillar mined is under a point in section 18, T 16 S, R 7 E. Cliff failure here could create a debris fan of about 10 acres. These acreages are estimations only, and err on the high side as historically, mines in the area have shown little subsidence effects from room-and-pillar mining in comparison to longwall mining. It is not likely that dislodged rock would reach perennial drainages, roads, or mine surface facilities because of the heavy timber on the slopes and presence of small tributary drainages that would channel and retard the downward movement of rock material.

Shallow and isolated mining-induced seismic events, generally less than 3.5 in magnitude (Richter Scale), are common (University of Utah Seismic Monitoring Program). Similar mining-induced seismic events are reasonably foreseeable in the Mill Fork Lease tract. These events are thought to be induced by the subsidence-induced cracking of overburden materials (especially rigid rock layers such as sandstone) above the mine workings. No damage to resources or overlying structures has been attributed to these events. There are no dams or buildings in the immediate vicinity of the tract that could be damaged, with the possible exception of the mine surface facilities. It is not likely that these low energy events would cause damage to the gas pipeline. Damage to the producing bore hole for the existing gas well (East Mountain #32-23) could occur but is not likely due to steel well casing and 800-foot radius coal buffer zone.

#### Mineral Resources

No new oil and gas leases would be offered within the proposed coal lease tract for the life of the lease (at least 20 years), however development on existing leases could occur. BLM might not approve any additional wells on existing leases until the coal lease tract is mined-out and subsidence is determined to be substantially complete. Additional oil and gas drilling would be located in areas where the coal would not be mined. There would be a loss of associated oil and gas lease competitive bids, annual lease payments, and potential gas production royalties (not possible to estimate due to extreme variability). This would be more than offset by the coal lease bonus bid, annual lease fees, and coal royalties associated with a potential coal lease.

If BLM approves additional wells on existing leases, it is reasonably foreseeable that 2 additional production wells could be drilled and several thousand feet of new gas transmission pipeline could be constructed. This would result in increased gas production and associated royalties. This would result in decreased coal recovery to protect the gas wells and pipelines from subsidence.

The tributaries of Indian Creek on the west side of the tract may be influenced by surface subsidence. Under the planned mining scenario, active workings would extend within approximately 500 feet of the Joes Valley Fault at the mine level. If longwall panels are extracted in this area, the angle-of-draw for subsidence may include the fault, and could focus subsidence along the fault to the surface. Cracks that could appear on the surface along the fault trace might divert water from the drainages. Loss of water from these drainages could reduce the water flow that supports the wetlands in the Indian Creek drainage.

Under this alternative, full extraction room-and-pillar mining in both seams could occur in the northeast portion of the lease tract, including the Little Bear Canyon drainage. Subsidence in this area could cause localized cracking of the surface that could cause water diversions within the watershed, from both springs and Little Bear creek. Overburden in the area ranges from 200 to 1,700 feet. Subsidence could also alter the fracture and/or fault systems present in the drainage that are thought to transmit water to the Little Bear Spring lower in the canyon. Because the management unit direction stated in the Forest Plan for Little Bear Canyon calls for preserving the watershed value, surface disturbance, including water diversions, that could result from mining-related subsidence would not be consistent with the management unit direction. Loss of water could deplete riparian vegetation and/or habitat.

Room-and-pillar extraction is also planned under small portions of the upper southern forks of Mill Fork Canyon. Overburden in this area ranges from 1,100 to 1,500 feet. Because of the thick overburden present, impacts to the intermittent drainage are not anticipated.

Mine water would be discharged at the approved NPDES point already in existence on Crandall Creek. Water discharged would have to meet quality standards described in the current NPDES permit before reaching Crandall Creek. The mine first discharged water at the NPDES point in 1996, the first time since operations began in 1984. Although mine water will be discharged at an approved location, mining would extend the need for mine discharge for 21 years. Effects on the channel character would not be anticipated unless total discharge from the mine increased the creek flows by 10 percent of maximum discharge (Rosgen, no date). Using a maximum instantaneous flow and the proportionate area of the watershed above the mine, a 10 % increase would be 4 cfs (Spencer and Kelly, 1984). Current discharge is 0.5 cfs. Because Crandall Creek has been identified as a steep bedrock channel immediately below the mine, impacts related to increased flow are not anticipated.

Riparian areas and small wetlands associated with seeps and springs within the lease tract could be affected by subsidence. However, most of the springs and seeps occur at locations over 800 feet above the mine level. As has been previously discussed, subsidence effects are not anticipated at locations where the overburden exceeds 600 feet.

A new Utah state law was passed regarding water affected by underground coal mining. The law states that the permittee (mine operator) "shall promptly replace any state-appropriated water in existence prior to the application for a surface coal mining and reclamation permit which has been affected by contamination, diminution, or interruption resulting from underground coal mining operations."



den present (over 2,000 feet), and layers of impermeable shales and clays in the North Horn and Price River Formations will buffer the effects of mining.

If monitoring during mining shows adverse effects to water flow or quality of a state-appropriated water source (such as Little Bear spring or the Rilda Canyon springs), the mining company would be required to replace the water source under state law. No provisions for requiring replacement water at the original source for non-culinary purposes such as stock watering, wildlife habitat, or ecosystem support are included in this alternative.

### C. Wildlife

#### Terrestrial Species

The alternative has limited potential to impact terrestrial wildlife species. Two bat species of special interest to Utah are the Western Big-eared Bat (*Plecotus townsendii*), which roosts in caves, rock overhangs, tunnels, or abandoned buildings, and the Spotted Bat (*Euderma maculatum*) depends on cliffs for roost/hibernation areas. Surveys have indicated that the spotted bat may be present. This alternative may affect the Western Big-eared Bat and Spotted Bat through the loss of roosting habitat in the cliffs. The spotted bat's roosting habitat is located on mountain side slopes in cracks and crevices in rock outcrops and escarpments. The area has not been inventoried for bats and it has some limited rock outcrops and escarpments. The potential of subsidence from mining the coal could remove some roosting habitat, and potentially result in the loss of a few bats. Subsidence-induced cracks could potentially enhance or degrade bat habitat.

The Townsend's big-eared bat uses juniper/pine forests, shrub/steppe grasslands, deciduous forests and mixed coniferous forests from sea level to 10,000 foot elevation. The project area includes mixed coniferous forest from 7,200 to 10,200 feet in elevation. Although two previous surveys did not locate any of these bats in the area there is potential that the bats could occur in Mill Fork Canyon. The bats roost in caves, mines shafts, or rocky outcrops.

Big game including mule deer and elk utilize the area. The proposed coal lease contains some winter and summer range for both species. These species would not be impacted as long as no surface disturbance was allowed. Ten coal exploration holes (drilling) may be anticipated, with temporary access roads, which can be timed to offset potential impacts. No permanent roads or other surface disturbances are proposed and there would not be any longterm affect to the big game species.

A number of bird species utilize the area. Potential impacts to the birds would result from the subsidence that could result in a change in the cracks on the rock cliffs and possibility some loss of cliff face. This would impact those birds that would nest on the cliffs such as golden eagles, red-tailed hawks, and American kestrel. Only the red-tailed hawk and the American kestrel are believed to nest within the propose coal lease. Both species will utilize trees for nesting and the loss of the cliff would have little impact on them with the exception of possible loss of young if the failure should occur during nesting season.

Subsidence could potentially result in the loss of surface water in Crandall Creek, Little Bear Canyon drainage, and tributaries supporting Indian Creek. This would result in the loss of riparian vegetation which is important habitat used by a number of species including goshawks, great horned owls, and Sharp-shinned Hawks. The loss of this riparian vegeta-

#### **F. Socioeconomics**

The proposed lease tract as delineated, assuming full extraction contains an estimated 75 million tons of recoverable coal. Because of limited access, it is assumed that the existing mine operator in the area will be the only interested lessee. The applicant currently has 20 million tons of remaining reserve in existing holdings. The mine is anticipated to achieve annual production of 2.75 to 3 million tons in 1997, 3.25 to 3.5 million tons in 1998 and 3.5 million tons thereafter until mineout. Without the tract, the reserves will last about 6 years or until 2002. With the tract, mining would continue for another 21 years until 2023. The additional reserves at current coal prices have a value of \$ 1.26 billion. Revenues to the Federal government from the lease tract (lease bonuses, royalties, rentals, etc.) will be from \$ 120 to \$ 141 million, which would be equally shared with State and County governments.

The likely lessee for the Mill Fork tract (Genwal Resources, Inc.) is in the process of permitting new facilities to increase the mine capacity by an estimated one million tons, bringing annual production to 3.5 million tons. Most of the new facilities will be built on fee land controlled by the mine. The leasing and subsequent development of the Mill Fork tract will essentially allow the mine to continue the planned coal production for 21 additional years. The prolonged mine life would contribute to continued employment and income primarily within Emery County. Using the planned production level of 3.5 million tons per year, employment is perceived to increase to 225 employees at the mine including trucking personnel. Direct revenues to the government per annum are estimated to be \$ 5.2 million, computing to \$ 141 million over the life of the mine.

In summary, the leasing and subsequent development of the Mill Fork tract would not be expected to have a significant increased socioeconomic impact on Emery or surrounding counties. Mine facilities are being permitted to achieve maximum production without the tract. The tract will enable the mine to maintain maximum production levels and employment and income for the next 25 year period. Emery County will be able to continue slow growth of 1% per year.

#### **G. Land Uses**

It is not likely that subsidence will affect range lands in the tract. The pre-mining land uses will not be changed. Subsidence may alter the position of land survey monuments, and lessen their viability as solid data points.

#### **H. Cultural Resources**

Potential impacts from underground coal mining can be isolated to limited surface cracking along plateau tops and isolated escarpment areas. In the southern 1/2 of the tract some portions of escarpments could witness large blocks of Castlegate Sandstone being dislodged and falling downslope. After further assessing the potential for significant sites to be located in these areas through review of existing data and an aerial reconnaissance of impact areas, we believe there should be no effect on significant cultural resources.

On September 11, 1995 the Forest consulted with the USHPO forwarded its finding that there should be no effects to significant cultural resources for the original lease tract. On September 20, 1995, the USHPO concurred with this determination. On March 14, 1997, the Forest forwarded its determination that there should also be no effects to significant cultural

### **3. Alternative 3 - Offer for Lease with Application of Special Coal Lease Stipulations for Protection of Non-Coal Resources**

Under this alternative, the tract would be offered for leasing as delineated. In addition to the standard BLM lease terms and conditions, the Forest Service Special Coal Lease Stipulations included in Appendix A would be applied to the lease.

#### **A. Geology, Soils and Mineral Resources**

If Genwal Resources, Inc. acquires the lease, underground coal extraction from the tract would likely involve extending workings of the Crandall Canyon mine to the south using standard industry mining practices. More specific details of the mining are discussed in the Reasonably Forseeable Development Scenario contained in Appendix B. With the Special Coal Lease Stipulations in place, approximately 68 million tons of coal could be mined under this alternative. This alternative would extend mine life by an additional 19 years.

Subsidence, escarpment failure, and mining-induced seismicity would likely be similar to that described for Alternative 2 with the following exceptions:

With the proposed mine plan submitted by Genwal, only the apparent escarpment on the north slope of the North Fork of Mill Fork canyon is to be undermined by longwall panels. Cliff failure could occur along the length of the escarpment, however, due to limited data on coal thickness, the conceptual mine plan shows longwall panels only under the western half of this escarpment. Much of the eastern portion of the cliff face will not be mined, or will be undermined by only the bleeder entries (no full extraction mining, coal pillars will be left for ventilation courses). It is likely that some cliff failure could occur, but the extent would be limited. If the entire face should fail, it is estimated that about 20-acres of debris fan would form. If only isolated portions of the face failed, then the estimated size of debris fan would be 5 to 10 acres. These acreages are crude estimations taken from aerial photos and topography maps. It is possible that some dislodged rocks could reach the intermittent drainage or the recreational trail in the North Fork of Mill Fork canyon.

Escarpments found with archaeological resources would be protected from subsidence by stipulation 9.

Mining-induced cracks along the surface expression of the Joes Valley Fault would be prevented by a lease stipulation that would prohibit full-extraction mining within the 22 degree angle-of-draw from the fault (Stipulation 19), application of this stipulation might result in the loss of about 120,000 tons of coal, based on the draft mining scenario.

Oil and gas effects will be the same as for Alternative 2.

#### **B. Hydrology**

##### **Surface Water**

The potential impacts from mining are the same as Alternative 2, except that Forest Service Stipulations 9 and 19 would be in effect.

riparian habitat sometimes used by species such as goshawks, great horned owls, and Sharp-shinned Hawks would be protected and there would be no direct or indirect effect to the species. Under Forest Service Stipulation 2, the lessee would be required to conduct an intensive field inventory of the area if T&E species or migratory bird species of high Federal interest are believed to occur in the area. Stipulation 20 would require the survey for Spotted Bat to determine if they are present, and further provide for their protection if animals are found.

#### **Aquatic Species**

Effects are generally the same as alternative 2, except that under this alternative, with stipulations 9 and 19 in effect, coal mining actions and their effects within all drainages in the lease tract would be subterranean and far-removed from aquatic habitats. The thickness of overburden is sufficient to prevent impacts to the stream channels or springs that feed the downstream alluvial system. Subsidence of stream channels would not occur, nor would there be direct or indirect effects to aquatic species of any life history stage or their habitats. Stipulation 17 would ensure that if water were diverted, it would be replaced to support the local ecosystem.

#### **D. Vegetation**

Effects under this alternative are the same as Alternative 2, except that stipulations 3 and 7 provide for baseline monitoring to detect changes in vegetation, and stipulations 9 and 17 provide protection for water resources. Therefore, under this alternative there should be no unmitigatable impacts to vegetation and range.

#### **E. Transportation**

Same as alternative 2, except that the return to level 'b' service would occur in 19 years.

#### **F. Socioeconomics**

Sixty eight million tons of coal could be mined, representing \$ 130 million in royalties. Employment would continue until 2021.

#### **G. Land Uses**

Same as alternative 2, except that stipulation 19 would require replacement of water sources, including those used to support livestock. Stipulation 16 would require replacement of land survey monuments and section corners disturbed by subsidence.

#### **H. Cultural Resources**

Effects to cultural resources would be the same as that identified in alternative 2. The stipulations provide additional protection for cultural resources discovered during operations under the lease. If significant cultural resources are discovered during operations, stipulation 1 provides for appropriate inventory, evaluation and mitigation.

lieved to transmit flow to Little Bear spring would not occur. The suspected recharge mechanism for the spring would be undisturbed. No changes in water quantity or quality at the spring would be anticipated, and therefore the culinary water source would be protected.

As in alternative 3, monitoring would be implemented, requirements for water replacement would be in effect, and the Forest Service would not consent to the mine plan unless the operator has committed to a water replacement plan.

#### **C. Wildlife**

##### **Terrestrial Species**

Same as alternative 3, except that riparian habitat and escarpments supporting species in the Little Bear drainage would be protected.

##### **Aquatic Species**

Effects would be the same as for alternatives 2 and 3. By eliminating the northeast portion of the tract, there would be no effects on the aquatic habitats or populations that are supported by Little Bear Spring or Creek. There would be no affect to the spring or the riparian habitat that it supports.

#### **D. Vegetation**

Same as for Alternative 3, except that water sources support riparian vegetation in Little Bear watershed would be protected.

#### **E. Transportation**

With the exclusion of the coal in the northeast portion, mine life is reduced by 2 years, hence reducing the length of time coal haul traffic would be present. The decrease from level B to C service, and subsequent return to B service would be 17 years.

#### **F. Socioeconomics**

This alternative drops the eastern portion of the tract reducing the recoverable reserves to 63 million tons, a loss of 5 million tons. This is a 7.4 % reduction in recoverable tons that will not affect the annual production of the mine, but will reduce the number of years of production. Due to the small number of tons involved and access limitation to coal outcrop, it is likely that the coal will not be mined in the future as it would not justify an independent operation. The years of mine life would be reduced by about 1.85 years, and the total revenue to the government could be reduced by \$ 10 million, to \$ 120 million. Employment would continue to 2019.

#### Alternative 4

Water resources and watershed values are protected, lessening the risk for impacts on riparian and macroinvertebrate productivity in the Little Bear Canyon drainage.

There would be a reduced amount of revenues generated by not mining the coal in the northeast portion of the tract. Approximately \$ 10 million in royalties would be lost, along with a reduction of total salaries paid of \$ 18.7 million. Mining of the coal under this alternative would extend the life of the Crandall Canyon mine by about 17 years.

#### 6. Cumulative Impacts

CEQ regulations (1508.7) define cumulative impact as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

Past, present, and reasonably foreseeable future actions in the Mill Fork Lease Tract area have been identified in support of this EA. The action, year of occurrence, and an estimate of residual, current, or anticipated effects, if any, are presented below. Actions are grouped by resource. The sum of the effects of these actions in addition to the anticipated direct and indirect effects of the proposed action will form the basis for the cumulative effects analysis. A summary of past, present and future actions are presented on Tables IV-A, B, and C, respectively.

#### Alternative 1

Under this alternative, there would be no changes to the current situation. No coal would be mined from the proposed lease tract, and no royalty payments would be received by the federal, state, and local governments. Coal mining would continue in the Crandall Canyon Mine adjacent to the proposed lease tract.

The area and ecosystem have been continuously altered by erosion, glacial activity, fires, insect infestations, and other natural processes prior to the appearance of man. The area has been used by man, probably on a seasonal basis, for about the last 9,000 years. European settlement in the 1870's resulted in hunting and trapping of game, timber harvest, livestock grazing, and eventually coal mining.

Livestock grazing on the Wasatch Plateau was extensive in the late 1800's, resulting in extensive watershed damage and erosion. Management of grazing by the Forest Service since 1906 has resulted in improved resource conditions. Today the range conditions are generally fair. The proposed lease tract includes parts of one cow and horse, and one sheep and goat grazing allotments. The present level of grazing will continue unchanged for the foreseeable future.

Coal has been mined in the Mill Fork area since the 1940's. Several mines have operated in the Rilda, Mill Fork and Crandall canyons from between the 1940's and the present. More detailed explanation of mining in the immediate area is given on Table IV-A.

drainages which truncate the continuity of the geologic strata. The drainage pattern forms narrow ridges that serve to limit the recharge areas within the lease tract.

More continuous water-bearing zones are contained in stratigraphic units that are exposed only in places at the very bottoms of canyons in the area, and typically these units are not saturated at the outcrop faces. The Star Point sandstone in the Wasatch Plateau has been known to exhibit variability in the degree of saturation, pressurization and depositional characteristics. In places, the unit is confined (meaning that water in the sandstone is under pressure), and other places it is not. The variability of the unit makes it difficult to evaluate continuous flow paths between areas. It is known that flow rates are low.

East Mountain is effectually isolated from other mountains in the vicinity by faults and major drainages. Recent studies have indicated that faults on the Wasatch Plateau tend to behave as barriers to horizontal ground-water flow (Mayo and Associates, 1997), this being the case, the western edge of East Mountain is isolated by the Joes Valley Fault. Faults maybe transporting water along their trends, as is thought the case for occurrence of Little Bear spring. Again Little Bear is an anomaly for the area, and no other springs of this magnitude occur in this area of the Wastatch Plateau. Similarly, major drainages tend to further isolate East Mountain. Huntington Canyon is a major feature in the Wasatch Plateau, and separates the East Mountain from Gentry Mountain to the east. Likewise, Cottonwood Creek drainage to the south separates East Mountain from Trail Mountain.

Some stratigraphic units below the elevation of local drainages may be in hydraulic communication within one another, however all these units are much deeper than the level of proposed mining, and would not be effected by mining in the area.

It is unlikely that the cumulative impacts would cause significant impacts to surface water resources (including associated riparian areas), terrestrial or aquatic wildlife (including threatened, endangered, or sensitive species), vegetation and range, or recreation, although some minor changes could occur. Because of the uncertainty of the hydrologic regime controlling Little Bear spring, although unlikely, there is a possibility that ground water resources could be affected.

Surface disturbance from coal exploration drilling, and possibly oil and gas drilling, are expected to result in removal of a small amount of vegetation, which could affect use by wildlife and livestock. The loss of vegetation would be minor and last only a few years. There would still be sufficient vegetation to maintain current populations and use. The River Gas Coalbed methane project is not anticipated to have effects in the tract area.

The expected traffic growth between Fairview and Huntington, Utah, along with the expected traffic growth onto the National Forest by other users of the National Forest when added to the extended (time period) and increased production (2.5 to 3.5 MM tons/year) will result in the UDOT having to increase maintenance expenditures on SR 31 and recommending that the highway template be upgraded to the current standard for the volume and composition of traffic expected during the planning period.

There could be changes to the transportation system, if the UDOT requires upgrading SR 31 to accomodate haul traffic. Effects on air quality would be limited by the terms of the Utah Air Quality Approval Order, and would be localized and insignificant.

**TABLE IV-A**  
**Summary of Past Actions**

PAST ACTIONS	IMPLEMENTATION DATES (Begin and Ending)	RESIDUAL EFFECTS
<p><b>MINERALS</b></p> <p><b>Tip Top Mine</b> on the south slope of Crandall Canyon (SE 1/4 NE 1/4, Sec 5, T 16 S, R 7 E, SLM). No residual effects. The Crandall Canyon Road (FDR 50248), now on the Transportation System, was most likely originally constructed for the mine and coal exploration. The Road is now a Forest Development Road from the SR 31 intersection to just above the Crandall Canyon Mine. The old road that continued up the canyon from the mine (now Forest Development Trail 390) was most likely originally build as a coal exploration/drilling road.</p>	1939 - 1956	Very small mine. Naturally revegetated. Disturbed area not evident.
<p><b>Crandall Canyon Mine</b> in Crandall Canyon (S 1/2 NW 1/4, Sec 5, T 16 S, R 7 E, SLM) - The mine was constructed in 1980 and is still an active mine. The mine has disturbed approximately 5.4 acres, not including the Crandall Canyon Road. The Crandall Canyon was widened to two lanes and asphalt paved to accommodate coal haul traffic.</p>	1980 - Present	The mine operates 24 hours a day, every day at differing intensities depending on production shifts. 5.4 acres of vegetation/habitat has been removed for operations. The physical activity and operations/haul traffic on the Crandall Canyon and Huntington Canyon roads impacts other resources and uses. Approximately 3,900 acres of NFS, State, and private lands included in permit area. Subsidence of mined lands is likely. No subsidence of Crandall Creek is permitted. No significant amount of subsidence to date and no surface expressions of subsidence have been detected.
<p><b>Old Leamaster Mine</b> in Mill Fork Canyon (NE 1/4 SE 1/4 SW 1/4, Sec 16, T 16 S, R 7 E, SLM). The original Mill Fork Road, now a Forest Development Road (FDR 50245), was probably constructed prior to 1943 for access to the mine and for coal exploration. The Forest Development Trail that extends several miles up the canyon, beyond the Forest Development Road (171, 391); and Trails 086 and 394 on the north slope of the canyon, were most likely originally constructed prior to 1943 as coal exploration roads. The road and trails are maintained on the Forest Transportation System.</p>	1943 - 1964	The old mine was reopened in 1976 as the Huntington Canyon #4 Mine (see below). Most of the original disturbed area was re-disturbed and expanded for the new surface facilities.
<p><b>Huntington Canyon #4 Mine</b> (SW 1/4SW 1/4, Sec 16, T 16 S, R 7 E, SLM). The mine was reconstructed at the Old Leamaster Mine in 1976 with a total surface disturbance of approximately 12.5 acres (almost all on pvt. inholdings). A 25KV powerline was constructed from the Huntington Canyon Power Plant in Huntington Canyon over the south Huntington Canyon slope to Mill Fork Canyon. Surface disturbance was minimized by helicopter installation and was designed to minimize impacts to raptors. The powerline remains today under a special-use permit and was extended in 1986 to provide service to the Crandall Canyon Mine. The mine was reclaimed in 1985 (recontoured to approximate original contour) and determined to be successful in 1985. Remnants of the highwalls are still visible. In 1985, the Mill Fork Road was reduced from two lanes to a single-lane (with turnouts). The second lane was recontoured and has been successfully revegetated. The permit area of 1,320 acres (pvt. and NFS lands) were only partially mined. No visible signs of subsidence.</p>	1976 - 1985	Reclaimed area well vegetated and sediment production should be similar to pre-disturbance levels. No visible signs of subsidence and no detectable mining-induced changes in water flow and quality.



PAST ACTIONS	IMPLEMENTATION DATES (Begin and Ending)	RESIDUAL EFFECTS
Water Troughs & Ponds for Crandall Ridge Allotment at Edmonds Bear Hole, Edmonds Willow Spring, Tuttle Mill Ridge, Tuttle Ridge, and a pond T 16 S, R 6 E, Secs 11, 13, 14, 23, & 24.	1982	For distribution of livestock.
<b>TRANSPORTATION</b>  Dispersed recreation, rural recreation, cordwood activities, range activities, and timber activities have contributed to the seasonal traffic volumes in and around the project area.		Road surface displacement/contamination of aggregate, user developed roads.
Placement of asphalt surfacing on Forest Development Road #50248 (Crandall Canyon Road) to provide structural support and travel surface for increase coal haulage.	1991	Less road surface displacement and decrease in road maintenance activities and cost.
Reclamation of Forest Development Road #50245 (Mill Fork Road) from two to one lane.	1985	The two-lane chemically stabilized travel-way was reduced to one-lane with turnouts to meet the resource and road management objectives for the area accessed. This provided a larger buffer between the road and stream, and left less road surface exposed for surface displacement in the future.
Reconstruction of Forest Development Road #50248 (Rilda Canyon Road) to North Emery Water Users spring source, forest trail head, and Rilda Canyon fan portal (Deer Creek Mine).	1994-95	Single-lane native surface road reconstructed to two-lane aggregate surface road with ditches and culverts to North Emery Water Users spring providing more dependable access. Single-lane native surface road reconstructed to single-lane with aggregate surface with ditches, culverts, and turnouts to forest trailhead and fan portal. Access gated at trailhead for emergency use only by motor vehicles. Reduced surface displacement of the aggregate stabilized travel surface and better dispersal of drainage water.
<b>RECREATION</b>  Construction of Indian Creek Campground and water development at western edge of the tract	1960's	Twelve campsites including 5 group sites and 7 family sites. General seasonal use from June 1 to September 30.
Dispersed recreation sites along the eastern boundary of the tract in Huntington Canyon.	Since 1900's	Sedimentation/Human waste
Trails in the tract include; Mill Fork Trail (#171), Mill Fork Ridge Trail (#086), and East Mountain Trail (#085)		The trails, respectively, 4 miles, 2 miles, and 2 miles in length have seen use historically for timber, mining, and firefighting access. Additionally, they are used for recreational purposes by hikers, horsemen, bicyclists, and seasonally by hunters and trappers.

**TABLE IV-C**  
**Summary of Reasonably Foreseeable Future Actions**  
**(within ten years; 1995-2005)**

REASONABLY FORESEEABLE	TIMING OF ACTIONS	ANTICIPATED EFFECTS
<p><b>MINERALS</b></p> <p>Crandall Canyon Mine in Crandall Canyon (S 1/2 NW 1/4, Sec 5, T 16 S, R 7 E, SLM) - Genwal Coal Company has proposed to expand the existing surface facilities on their private inholdings (pvt. surface and coal). The expansion as proposed would culvert approximately 1,500 feet of Crandall Creek to build additional mine surface facilities consisting of a large open coal pile/truck loading facility, truck loading scales, new office, bathhouse, parking lot, etc. In addition, Genwal has proposed to construct new portals on the South slope of the canyon to access the Blind Canyon Seam (upper seam). New disturbance is all on their private lands and would disturb an additional 4 acres. Added to the existing 6 acres disturbed for surface facilities, the disturbed area would be increased to a total of 10 acres. Construction of a merge lane on Hwy. 31 at the Crandall Canyon Road intersection has also been proposed for traffic safety purposes. This would disturb another 0.5 acres of riparian vegetation along Huntington Creek. The mine will progress into Sec. 2 (State Lease ML-21568, 960 acres). Production will increase from the present rate of 2.5 million tons per year to 3.5 tons per year.</p>	<p>1997 - 2012</p>	<p>Approximately 1,500 feet of Crandall Creek would be in a culvert, removing this stream segment from available habitat for aquatic wildlife. Approximately 4.5 acres of riparian vegetation and habitat will be removed from aquatic and terrestrial wildlife habitat. The present activity, resulting in impacts to wildlife, recreation, traffic conflicts would continue another 5 years (1997 - 2002) over the existing life of the mine. State Lease ML-21568 will be mined and subsided (960 acres). Reclamation of the site would take another 10 years to be completed and fully successful (2000 - 2010). Offsite mitigations have been negotiated between the UDWR, USFS and Genwal Resources, Inc.</p>
<p>Gas Exploration/Development - Burlington Resources (operator of the Flat Canyon/Indian Creek Gas Field) could propose 2 additional gas exploration/production wells on existing oil and gas leases on East Mountain in the Mill Fork Lease Tract. The most likely locations would be the ridge tops located in Sections 13 or 14 on East Mountain at the head of Mill Fork Canyon. It is not likely that new oil and gas leases would be issued within the tract until coal mining in the tract is completed. Approx. 0.5 mile of new road (1.5 acres of dist.) and 2 pads (4 acres) would be required. The wells would be converted to gas production wells.</p>	<p>1999 - 2020</p>	<p>Approximately 5.5 acres would be disturbed for drilling. Assuming that the two wells would be drilled in two successive years, activity disturbances would be for 60 days in two successive years. Production would last for 20 years and physical disturbance would be limited to compressor noise, and weekly visits by field maintenance personnel. After reclamation (last 5 years of 20 year production term), vegetation would be re-established.</p>
<p>Oil and Gas Exploration/Production - Azalea Oil has proposed to drill a 16,000 ft. wildcat well in either North Hughes or Engineer's Canyon. Approximately 3 acres would be disturbed for road and pad construction. Construction and drilling would take place in the same season. If this well produced economic amounts of oil or gas, a second well would be drilled in the other canyon (additional 2.5 acres). A third well could be drilled in Mill Fork or Rilda Canyon if the other two are producers. This would require a pad (2 acres) and reconstruction of the Mill Fork Road (2.5 acres) if located in Mill Fork Canyon. Assume successive season for second and third wells. Drill time for each well would be 150 days. Traffic for 1 week move-in and 1 week move-out of drill rig would be 100 vehicles per day. Average daily traffic would be 16 vehicles per day.</p>	<p>1997 - 2020</p>	<p>10 acres of disturbance for 20 years if production at all 3 wells. If first well not a producer, only one well drilled in 1997 or 1998 and would be reclaimed in the fall after drilling. Would take 5 years to successfully revegetate disturbed area.</p>

## V. PERSONNEL AND PUBLIC INVOLVEMENT

### A. Interdisciplinary Team and Consultants

The following are the Interdisciplinary Team (IDT) members and consultants who participated in the environmental analysis:

<i>Specialty</i>	<i>Specialist</i>	<i>Role</i>
NEPA/Geology	Jeff DeFreest	ID Team Leader
Hydrogeology	Liane Mattson	Deputy Team Leader
Engineering	Brent Barney	Core Team
Fisheries/NEPA Consult	Jill Dufour	Core Team
Socioeconomics/NEPA	Max Nielson (BLM)	Core Team
Geology	Carter Reed	Extended IDT
Mining Engineering	Stephen Falk (BLM)	Extended IDT
OSM Representative	Floyd McMullen (OSM)	Extended IDT
Wildlife Biology	Wayne Ludington (BLM)	Extended IDT
Botany/Range	Bob Thompson	Extended IDT
Hydrology	Dennis Kelly	Extended IDT
Cultural Resources	Stan McDonald	Extended IDT
Landscape Arch	Kevin Draper	Extended IDT
Soils	Dan Larsen	Consultant

In addition to the IDT, the following agencies were contacted in regard to application of the Unsuitability Criteria and in compiling resource data:

U.S. Fish and Wildlife Service  
Utah Division of Wildlife Resources  
Utah State Historic Preservation Office  
Genwal Resources, Inc

### B. Public Contacts

News releases which notified the general public that the Forest Service and Bureau of Land Management would be evaluating the coal lease application and requesting public comment were published in the *Sun Advocate* and *Emery County Progress* newspapers.

Letters were sent to over a hundred identified interested individuals and organizations requesting comments. The initial mailing list is included in the project file.

Appendix C contains a copy of the letter and a list of individuals and organizations who responded. A summation of the responses is in section I.H. of this report.

A contact was also made with the local Native American Tribal counsel and a response received, requesting to be kept on the mailing list, but not identifying any issues at this time.

## VI. REFERENCES

### *General*

USDA-FS. 1986. Manti-La Sal National Forest Land and Management Resource Plan, Final Environmental Impact Statement and Record of Decision.

USDA-FS, Intermountain Region. 1992. Environmental Impact Statement for Oil and Gas Leasing on Lands Administered by the Manti-La Sal National Forest.

USDI-BLM, Moab District. 1992. San Rafael Planning Area, Management Framework Plan.

USDI-BLM, Uinta-Southeastern Utah Coal Region. 1996. Tract Delineation Review Report, Lease By Application, UTU-71307.

### *Geology*

Kitzmiller II, J.M. 1982. Preliminary Geologic Map of the Joes Valley Reservoir Quadrangle, Emery and Sanpete Counties, Utah. Utah Geological and Mineral Survey.

Fry, R. and T. Lloyd 1990. *Results of a Resistivity -- Induced Polarization Survey, Rilda and Mill Fork Canyons for Utah Power and Light*

Larsen, D. Soil Survey of the Manti-La Sal National Forest, Manti Division, Utah, Part of Carbon, Emery, Sanpete, Sevier and Utah Counties, Soil Survey Area 645. USDA, Forest Service, Intermountain Region (in preparation).

Nielson Hydrogeologic Services. 1996. "Ground-water Flow to Little Bear Spring and Possible Impacts to Ground-water Flow by Expansion of Underground Mining into the Mill Fork Lease Tract." Letter to Castle Valley Special Services District, December 9, 1996.

### *Hydrology*

AAA Engineering and Drafting. 1979. Coal Resource Occurrence Map of the NW 1/4 Hiawatha 15-Minute Quadrangle, Emery and Sanpete Counties, UT. U.S. Geological Survey Open-File Report 79-487.

Alvord, D.C. 1979. Little Bear Canyon Tract Delineation Report. U.S. Geological Survey, Conservation Division.

Beaver Creek Coal Company. 1983. Huntington Canyon #4 Mine Permit Application.

Brown, T.L. et al. 1987. Stratigraphic Framework and Coal Resources of the Upper Cretaceous Blackhawk Formation in the East and Gentry Mountain Areas of the Wasatch Plateau Coalfield, Manti 30' x 60' Quadrangle, Emery, Carbon and Sanpete Counties, Utah. U.S. Geological Survey Coal Investigations Map C-94-D.

Spencer, Steven M. and G. Dennis Kelly. 1984. *Watershed inventory and Analysis for the Huntington Creek Watershed*. Price Ranger District, Manti-La Sal National Forest, Price, Utah. 3 Volumes.

Strahler, Arthur N. 1957. "Quantitative Analysis of Watershed Geomorphology". Transactions, American Geophysical Union. Volume 38, No. 6 pages 913-920).

Sumison, C.T. 1979. Selected Coal-Related Ground-Water Data, Wasatch Plateau-Book Cliffs Area, Utah. U.S. Geological Survey Open-File report 79-915.

U.S. Geological Survey. 1978-1984. Water Resource Data, Utah, Water-Data Reports, UT-78-1 to UT-84-1.

Wadell, K.M., etal. 1981. Hydrologic Reconnaissance of the Wasatch Plateau-Book Cliffs Coal-Fields Area, Utah. U.S. Geological Survey Water-Supply Paper 2068.

#### *Aquatic Wildlife*

Bjornn, T.C. and D.W. Reiser. 1991. Habitat requirements of salmonids in streams. In: Influences of forest and rangeland management on salmonid fishes and their habitats. Amer. Fish. Soc. Special Publ. 19:83-138.

Boyer, M. 1997. Report of fish population surveys in Crandall Creek. Unpubl. internal document. Utah Division of Wildlife Resources.

Christopherson, K. 1997. Personal communication, Utah Division of Wildlife Resources, Price Office.

Dufour, J.A. 1996. Field Observations on the Manti-La Sal National Forest. Forest Fisheries Biologist.

Sigler, W.F. and R.R. Miller. 1963. Fishes of Utah. 203 pp.

Stebbins, R.C. 1985. Western reptiles and amphibians. 338 pp.

Utah Division of Wildlife Resources, various years. Survey data. Southeast Region Office, Price.

#### *Vegetation*

Manti-La Sal National Forest 1987, Final Environmental Impact Statement.

Thompson, R. 1992. Threatened, endangered and sensitive plant species plan. Internal unpublished document.

#### *Visual*

USDA, Forest Service, 1973, National Forest Landscape Management, Volume 1, Agriculture Handbook 434, Washington DC.

## APPENDIX A SPECIAL COAL LEASE STIPULATIONS

Federal Regulations 43 CFR 3400 pertaining to Coal Management make provisions for the Surface Management Agency, the surface of which is under the jurisdiction of any Federal agency other than the Department of Interior, to consent to leasing and to prescribe conditions to insure the use and protection of the lands. All or part of this lease contain lands the surface of which are managed by the United States Department of Agriculture, Forest Service - Manti-La Sal National Forest.

The following stipulations pertain to the Lessee responsibility for mining operations on the lease area and on adjacent areas as may be specifically designated on National Forest System lands.

### Forest Service Stipulation #1.

Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the Lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources.

If cultural resources or paleontological remains (fossils) of significant scientific interest are discovered during operations under this lease, the Lessee prior to disturbance shall immediately bring them to the attention of the appropriate authority. Paleontological remains of significant scientific interest do not include leaves, ferns or dinosaur tracks commonly encountered during underground mining operations.

The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the Lessee.

### Forest Service Stipulation #2.

If there is reason to believe that Threatened or Endangered (T&E) species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance.

The cost of conducting the inventory, preparing reports and carrying out mitigating measures shall be borne by the Lessee.

### Forest Service Stipulation #3.

The Lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface hydrology, vegetation and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.

Forest Service Stipulation #10.

In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the mine, except at specific approved locations.

Forest Service Stipulation #11.

If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the surface management agency.

Forest Service Stipulation #12.

The coal contained within, and authorized for mining under this lease shall be extracted only by underground mining methods.

Forest Service Stipulation #13.

Existing Forest Service owned or permitted surface improvements will need to be protected, restored, or replaced to provide for the continuance of current land uses.

Forest Service Stipulation #14.

In order to protect big-game wintering areas, elk calving and deer fawning areas, sagegrouse strutting areas, and other key wildlife habitat and/or activities, specific surface uses outside the mine development area may be curtailed during specified periods of the year.

Forest Service Stipulation #15.

Support facilities, structures, equipment, and similar developments will be removed from the lease area within two years after the final termination of use of such facilities. This provision shall apply unless the requirement of Section 10 of the lease form is applicable. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages re-established, and the areas returned to a premining land use.

Forest Service Stipulation #16.

The Lessee, at the conclusion of the mining operation, or at other times as surface disturbance related to mining may occur, will replace all damaged, disturbed or displaced corner monuments (section corners, 1/4 corners, etc.), their accessories and appendages (witness trees, bearing trees, etc.), or restore them to their original condition and location, or at other locations that meet the requirements of the rectangular surveying system. This work shall be conducted at the expense of the Lessee, by a professional land surveyor registered in the State of Utah, and to the standards and guidelines found in the Manual of Surveying Instructions, United States Department of the Interior.

Forest Service Stipulation #19.

Except at specifically approved locations, mining that would cause subsidence will not be permitted within a zone along the Joes Valley Fault determined by projecting a 22 degree angle-of-draw (from vertical) eastward from the surface expression of the Joes Valley Fault, down to the top of the coal seam to be mined.

Forest Service Stipulation #20.

A survey for spotted bats (USDA-FS Sensitive Species) will be conducted within the lease tract prior to the lease sale. If bats are located, then evaluations will be made for mitigation needs. Mitigations could include avoidance during specific times and/or the prevention of bat occupancy during periods of subsidence, such as by netting or screening. Mitigations will be evaluated on a case-by-case basis.



## Appendix B

### REASONABLY FORSEEABLE DEVELOPMENT SCENARIO

The conceptual mine plan presented in this Reasonably Forseeable Development Scenario was submitted by the mining company and validated by the BLM as being consistent with the standard lease terms, conditions and special stipulations included in Alternatives 3 and 4.

Longwall mining will be the primary method of coal extraction in the Mill Fork Lease Tract. Two coal seams, the Blind Canyon and the Hiawatha are considered mineable in the tract. The two seams are separated by 80 to 120 feet of sandstone and shale interburden. There will be areas where only the Blind Canyon will be mined, areas where only the Hiawatha will be mined, and areas where extraction will occur in both seams (multiple-seam mining). Thin coal precludes longwall mining in parts of the southeastern and northeastern portions of the tract. Room-and-pillar mining would then be used in these areas.

Single-seam longwall mining is projected in the Blind Canyon seam under section 7 and will extend under the NW 1/4, NW 1/4 section 8 (T 16 S, R 7 E). Longwall panels are planned for the Hiawatha seam only under the S 1/2, S 1/2 section 14 extending south and east under the N 1/2 section 13, and the NW 1/4 section 24 (T 16 S, R 6 E). Another single panel is projected to straddle the northern lease boundary in section 1, T 16 S, R 6 E, and section 6, T 16 S, R 7 E. The panel has been designed to provide a buffer zone off Crandall Creek by using a 22.5 degree angle-of-draw. This provides that extent of the panel and the associated subsidence would not interfere with the creek or associated riparian areas. However, knowing that mine plans can change due to coal thickness and conditions underground, it is possible that the panel location could shift to underlie Crandall Creek. In Alternatives 3 and 4, the Forest Service Service Special Coal Lease Stipulation 9, that prevents subsidence of perennial streams will be in effect.

Multiple-seam extraction will occur under sections 11, 14, 12, and the N 1/2, N 1/2 section 13 (T 16 S, R 6 E). Longwall panels are projected to run west to east, with a north-trending set of mains separating two blocks of panels. The panels in the two seams will be superimposed. The panels will be extracted in sequence from north to south on the west side of the mains, and from south to north on the east side. The Blind Canyon seam will be extracted first. There will be an estimated 18 panels of varying lengths in the Blind Canyon seam, and an estimated 17 in the Hiawatha seam.

Room-and-pillar mining will be used to develop gateroads and entries for longwall mining, and for extraction of coal in other areas where longwall is not feasible. Extraction by room-and-pillar method will be used in the northeast portion of the lease tract (east of section 7), and in section 13. In the northeast portion of the lease tract, the planned mining scenario is to use room-and-pillar extraction in both seams.

Subsidence is usually coincident with longwall mining and is transmitted rapidly from the workings to the surface. Once subsidence has begun it will progress with the direction of mining and continue until after the last longwall panel in the block is complete. The total subsided area will include the surface area above the extracted longwall blocks, the room-and-pillar areas where pillars are recovered, plus an additional area determined by the angle-of-draw. Final subsidence contours for a large block of longwall and room-and-pillar recovery panels extracted from a single coal seam would resemble a broad irregularly shaped trough with maximum subsidence occurring towards the center of the block. Maximum subsidence is usually less than the mining height, due to bulking of the overburden strata. The extent and magnitude of subsidence is dependent on the physical properties

Guidance from the SME Mining Engineering Handbook, 2nd Edition states that suggested vertical distance between mining and water bodies should exceed 60 times the mining height (SME, p. 962). Where the overburden is greater than 600 feet, it is therefore unlikely that there would be direct hydrologic connection between surface flow and underground workings. In another study of undermining a perennial stream on the Wasatch Plateau where 600 feet of overburden is present, stream flows did not appear to have been affected (Sidle 1995).

The potential for a surface crack to divert water underground prior to healing is further limited by the characteristics of the local formations which consists of interbedded claystone, siltstone, and sandstone. Although material may fracture at the surface, the fractures are prone to heal rapidly because of the expanding nature of the montmorillonite clays. The CHEMPET Research Corp. analyzed drill core material from the Blackhawk Formation through X-ray diffraction and found it to contain 58% montmorillonite clay (Hurst, 1989). Bentonite, which is essentially composed of montmorillonite, is able to absorb water and increase in volume several times (Hurlbut, 1971). The Blackhawk Formation does not readily receive an influx of surface water because the claystone and siltstone have a low permeability and the higher permeability sandstones are lenticular and pinch out in a short distance.

There is an existing natural gas well within the lease tract in section 23, T 16 S, R 6 E. The oil and gas targets in the area are all below the coal seams, requiring drilling and well completion through the coal. A block of coal will be left in place surrounding the well to preserve the integrity. If conflicts arise with this issue, they will be resolved by the BLM.

#### References:

Dyni, R.C. 1991. Subsidence resulting From Multiple-Seam Longwall Mining in the Western United States- A Characterization Study. U.S. Department of the Interior, Bureau of Mines, Information Circular 9297.

Hurlbut, C. S. 1971. Dana's Manual of Mineralogy, 18th Edition. John Wiley and Sons, Inc., New York.

Hurst. 1989. CHEMPET Research Corporation, Analysis File No. 890028. Moorpark, California.

Magers, J.A. 1993. Surface Subsidence Over a Room-and-Pillar Mine in the Western United States. U.S. Department of the Interior, Bureau of Mines, Information Circular 9347.

Sidle, R.C. 1995. Changes in Stream Channel Characteristics and Hydraulic Parameters Related to Surface Subsidence, Intermin Report No. 2. USDA-Forest Service Intermountain Research Station, Logan, Utah.

Society of Mining Engineers. 1993. Surface Subsidence Engineering.

United States  
Department of  
Agriculture

Forest  
Service

Manti-La Sal  
National Forest

Ferron/Price Ranger District  
Price Work Center  
599 West Price River Drive  
Price, Utah 84501

File Code: 2820-4

Date: November 19, 1996

Interested Participant:

The Bureau of Land Management (BLM) and the Forest Service will be evaluating an application by Genwal Resources, Inc. to lease federal lands in Emery County for coal development. The proposed Mill Fork Lease Tract (UTU-71307) lies to the south of Genwal's Crandall Canyon Mine facilities, as shown on the attached maps. If they are the successful bidder, the company plans to access the lease tract from the Crandall Canyon facilities.

The application will be processed according to Lease-on-Application procedures described in 43 CFR 3425. The tract encompasses about 6,440 acres of federal coal lands contained within the Manti-La Sal National Forest. The BLM administers the subsurface mineral estate. Under the existing Forest Plan, it was determined that the lands are available for further consideration for coal leasing. The two agencies will jointly conduct an environmental analysis according to 43 CFR 3400 and the National Environmental Policy Act of 1969 (NEPA).

The agencies are inviting Federal, State, and local agencies; permittees; and other individuals or organizations interested in, or potentially affected by the proposal to become involved in the public participation process. Through this public involvement (scoping) process, the agencies seek to provide information to the public on the proposed action and to identify the issues. Your comments will help focus the analysis team on the pertinent issues and result in a concise evaluation and disclosure of effects in the final document.

We are often asked to better define what we are really looking for when we ask the public for input. Project analyses conducted under the guidelines of NEPA are driven by project objectives (purpose and need) and issues. An issue is a clear statement of an effect or outcome the proposal might have on people and/or the environment. To help us identify pertinent issues, it would be helpful if you would respond with information specific to resource, location, and what you think the impact of coal leasing would be on that resource at that location, and why. If specific information related to an issue is provided, the risk of us misinterpreting what you want addressed in the analysis may be reduced.

If you comment during scoping, you will remain on our mailing list and receive further information concerning this project. If you wish to remain on the mailing list for this project but do not wish to comment at this time, please send us a postcard or contact us with your request. Those who do not respond to us, either by submitting comments or by sending a postcard, will not receive additional information.

**TABLE 1**  
**MAILING LIST RESPONDENTS**

RESPONSE NUMBER/DATE	COMPANY/ORGANIZATION	NAME	ADDRESS
#1 11/25/96	Emery County	Rosann Fillmore	PO Box 297 Huntington, UT 84513
#2 11/26/96	State of Utah Dept. of Transportation	Kleston Laws	Route # 3 Box 75C5 Price, UT 84501
#3 11/25/96	Trail Mtn Livestock Permitees	Horace Petty Paul Peacock L. Jack Curtis	Address not provided
#4 11/29/96	USDI, Office of Surface Mining	Ranvir Singh, PE	1999 Broadway, Suite 3320 Denver, Co. 80202
#5 11/27/96	State of Utah Div of Oil, Gas & Mining	Mary Ann Wright	355 W. North Temple S.L.C. Utah 84180
#6 12/6/96	Huntington City Council	Ross Gordon	No Return Address
#7 12/4/96	Huntington City	Mayor/Council	No Return Address
#8 12/5/96	Cleveland Town	Ron VanWagoner	P.O. Box 325 Cleveland, Utah 84518
#9 12/4/96	Huntington-Cleveland Irrigation Company	Duane Jensen	55 N. Main Huntington, Utah 84528
#10 12/4/96	Emery Water Conservancy District	Jay M. Humphrey	P.O.Box 998 Castle Dale, Utah 84513
#11 12/8/96	Utah Wildlife Federation	Gerald Gordon	P.O. Box 65636 S.L.C. Utah 84165
#12 12/12/96	North Emery Water Users Association	Menco Copinga	Box 129 Cleveland, Utah 84518
#13 12/12/96	Nielson & Senior	J.Craig Smith	60 E. South Temple S.L.C. Utah 84111
#14 12/12/96		Dick Neilson	P.O. Box 555 Huntington, Utah 84528
#15 12/13/96	Castle Valley Special Services District	Darrel Leamaster	Castle Valley Special Services District Castle Dale, UT 84513
#16 12/12/96	Burlington Resources	Eileen Danni Dey	P.O. Box 51810 Midland, Texas 79710
#17 12/12/96	Appel & Warlaumont L.C.	Jeffrey Appel	1100 Boston Bldg 9 Exchange Place S.L.C. Utah 84111